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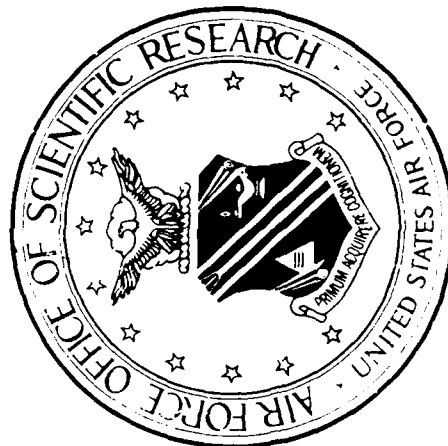
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# AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

## Air Force Systems Command

### AFOSR

#### TECHNICAL REPORT SUMMARIES



APRIL—JUNE 1984

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AFOSR-TR- 89-1529

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*BARBARA WERT, CHIEF*

*TECHNICAL DOCUMENTS SECTION*

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## INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

### 1) SUBJECT INDEX

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## PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

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AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

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DTIC Report Bibliography - DTIC's brief description of a technical report.

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Field & Group Numbers - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization - The organization; e.g., college/university, company, etc., at which the research is conducted.

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Project Number - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

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Unimolecular Dissociation Rates of  
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Resonance-Enhanced Multiphoton  
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The Periodically Forced Conversion  
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LSI/VLSI (Large Scale  
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LSI/VLSI (Large Scale  
Integration/Very Large Scale  
Integration) Ion Implanted GaAs  
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Appendix A. Feasibility Analysis of  
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AD-A139 677

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LSI/VLSI (Large Scale  
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Appendix B. Two-Dimensional  
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# ABSTRACTS

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AD-B082 310 CONTINUED

DAYTON UNIV OH RESEARCH INST

(U) Ordered Polymers Workshop Held at Dayton, Ohio on 18-18 November 1983.

DESCRIPTIVE NOTE: Final rept. 15 Oct 83-15 Jan 84,

JAN 84 55P

PERSONAL AUTHORS: Wiff, D. R. ;

REPORT NO. UDR-TR-84-06

CONTRACT NO. AFOSR-84-0023

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR  
TR-84-0348

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies and their contractors; Critical Technology; 23 Apr 84. Other requests must be referred to Air Force Office of Scientific Research/XOTD, Bolling AFB, Washington, DC 20332.

ABSTRACT: (U) The University of Dayton Research Institute, Nonmetallic Materials Division, Polymer Science Department, held an Ordered Polymers Workshop, 18-18 November 1983. The purpose of this meeting was to introduce and transfer the ordered polymer technology to as wide an audience as possible from industrial, academic, and Department of Defense laboratories. Many aspects of the program are presently providing spectacular results. The monomer/polymer work has achieved scaleup to the 30-pound level. Fiber formation has proceeded successfully to achievement of outstanding property levels and commercial production rates have been demonstrated. The ribbon development work has been quite successful and produced mechanical properties that approach fiber values. The molecular composites concept has been verified, and very interesting thermo-plastic rigid-rod molecular composites have been formed. To help this technology transfer, the attendees were provided with a bibliography (Section V) of all published research sponsored under the

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Air Force Ordered Polymers Program. The workshop agenda (Section II) and a summary of all scientific papers (Section III) are included in this report.

DESCRIPTORS: (U) \*Polymers, \*Workshops, Monomers, Fibers, Manufacturing, Production rate, Mechanical properties, Composite materials, Thermoplastic resins, Technology transfer, Bibliographies, Synthesis, Polymerization, Thermal properties, Transport properties, Solubility, Electrical conductivity, Molecular structure, Morphology, Surface properties

IDENTIFIERS: (U) WUAFOSR2303A3, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-B080 167L 8/11 18/3 12/1 AD-B080 167L CONTINUED

WOODWARD-CLYDE CONSULTANTS PASADENA CA

(U) Estimating Seismic Yield and Defining Distinct Test Sites Using Complete Waveform Information.

DESCRIPTIVE NOTE: Final rept. 15 Dec 82-15 Nov 83.

NOV 83 264P

PERSONAL AUTHORS: Lay, T. ; Burdick, L. J. ; Helmberger, D. V. ; Arvesen, C. G. ;

REPORT NO. WCCP-R-84-01

CONTRACT NO. F49620-83-C-0051, ARPA Order-4692

MONITOR: AFOSK  
TR-84-0258

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 2 Mar 84. Other requests must be referred to DARPA/TIO, 1400 Wilson Blvd., Arlington, VA 22209.

ABSTRACT: (U) A new method for estimating the yields of events at a nuclear test site, and for identifying anomalous events and distinct subsites, is introduced and tested using Amchitka and NTS events. The intercorrelation method is an analytic relative waveform comparison technique, which involves convolution of the first few seconds of each short-period P wave recorded at a given station for two events with estimates of the effective source function (including PP) for the other events. This procedure accounts for common path and receiver effects as well as differences in time functions and near-source interactions. If the source parameters for a master event are determined independently, the assumed source parameters for a second event can be adjusted to minimize the residual differences in the intercorrelated signal pairs for a large number of stations simultaneously. Yield estimates can then be made using empirical relation between the source parameters and yield. The intercorrelation procedure is applied to a large data set of 1,113 short-period P waves from 25 large Pahute Mesa explosions. This provides yield estimates which are compared to those resulting from relative amplitude analysis. In several cases these two procedures provide significantly different yield

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NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

(U) Brussellator Isolator,

DEC 83

8P

PERSONAL AUTHORS: Erneux, T.; Reiss, E. L.;

CONTRACT NO. N00014-80-C-0196, AFOSR-80-0016

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0371

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. of Applied  
Mathematics, v43 n6 p1240-1246 Dec 83.

Reprint: Brussellator Isolator.

DESCRIPTORS: (U) \*Mathematical models, \*Chemistry,  
\*Bifurcation(Mathematics), Computations, Patterns,  
Perturbations, Boundary value problems, Reprints

IDENTIFIERS: (U) \*Brussellators, Isolator, PE61102F,  
WUAFOSR2304A4

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STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Resonance-Enhanced Multiphoton Ionization of Molecular  
Hydrogen via the Three Vibronic Levels of the Inner  
Well of the E, F State: Photoelectron Energy and  
Angular Distributions.

MAR 84

8P

PERSONAL AUTHORS: Anderson, S. L.; Kubiak, G. D.; Zare, R. N.

CONTRACT NO. F49620-83-C-0033, N00014-78-C-0403

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0298

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters,  
v105 n1 p21-27, 2 Mar 84.

Reprint: Resonance-Enhanced Multiphoton Ionization of  
Molecular Hydrogen via the Three Vibronic Levels of the  
Inner Well of the E, F State: Photoelectron Energy and  
Angular Distributions.

DESCRIPTORS: (U) \*Photoionization, \*Hydrogen,  
Photoelectrons, Electron energy, Angular motion,  
Distribution, Resonance, Electronic states, Molecular  
vibration, Ions, Dye lasers, Raman spectra, Light  
scattering, Reprints

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F

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AD-A141 371 7/3 6/1

TORONTO UNIV (ONTARIO) DEPT OF CHEMISTRY

GEORGETOWN UNIV WASHINGTON DC DEPT OF CHEMISTRY

(U) Time-Delayed Photoelectric Effect,

(U) On One-Dimensional Nucleation and Growth of 'Living' Polymers. II. Growth at Constant Monomer Concentration,

NOV 83 4P

83 19P

PERSONAL AUTHORS: Billard, T. C. ; Burns, G. ;

PERSONAL AUTHORS: Rangarajan, S. K. ; de Levie, R. ;

CONTRACT NO. AFOSR-81-0028

CONTRACT NO. AFOSR-80-0262

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR  
TR-84-0302

MONITOR: AFOSR  
TR-84-0328

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Nature, v306 n5940 p247-248, 17 Nov 83.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Theoretical Biology, v104 p553-570 1983. See also AD-A141 166.

Reprint: Time-Delayed Photoelectric Effect.

Reprint: On One-Dimensional Nucleation and Growth of 'Living' Polymers. II. Growth at Constant Monomer Concentration.

DESCRIPTORS: (U) \*Photoelectric effect, \*Electron energy, \*Photoelectric emission, Photons, Energy, Electron energy, Kinetic energy, Light pulses, Low intensity, Photosensitivity, Time, Delay, Laser beams, Photocathodes, Dye lasers, Reprints

DESCRIPTORS: (U) \*Polymers, \*Biological products, \*Nucleation, \*Reaction kinetics, Growth(General), Monomers, Concentration(Chemistry), Polymerization, Constants, Dissociation, Molecular association, Dispersing, Clustering, Absorption, Agglomerates, Mathematical analysis, Reprints

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F

IDENTIFIERS: (U) WUAFOSR2303A1, PE61102F

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A141 358 20/1

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

(U) A Distributed Memory Management System for PASM.

(U) Acoustic Propagation in Wall Shear Flows and the  
Formation of Caustics.

OCT 83 10P

PERSONAL AUTHORS: Kuehn, J. T. ; Siegel, H. J. ; Grosz, M. ;

DEC 83 13P

CONTRACT NO. AFOSR-78-3581

PERSONAL AUTHORS: Kriegsmann, G. A. ; Reiss, E. L. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-80-0016

TASK NO. A7

PROJECT NO. 2304

MONITOR: AFOSR  
TR-84-0377MONITOR: AFOSR  
TR-84-0374

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the Computer  
Society Workshop on Computer Architecture and Pattern  
Analysis and Image Database Management, p101-108 Oct 83.  
Reprint: A Distributed Memory Management System for PASM.

DESCRIPTORS: (U) \*Distributed data processing, \*Memory  
devices, \*Data management, Computer architecture, Image  
processing, Pattern recognition, Data bases,  
Multiprocessors, Microprocessors, Parallel processing,  
Algorithms, Files(Records), Directories, Workshops,  
Reprints

IDENTIFIERS: (U) PASM computer system, PE61102F,  
WUAFOSR2304A7

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Acoustical  
Society of America, v74 n6 p1889-1879 Dec 83.

Reprint: Acoustic Propagation in Wall Shear Flows and the  
Formation of Caustics.

DESCRIPTORS: (U) \*Acoustic waves, Wave propagation,  
Walls, Ray tracing, Turbulent boundary layer, Reprints

IDENTIFIERS: (U) Shear flow, Caustics, PE61102F,  
WUAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A141 358

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TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF MATHEMATICS

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) The Stability of Atmospheric Fields Induced by  
Localized Topography and Heat Sources.

(U) Independence via Uncorrelatedness under Certain  
Dependence Structures.

DESCRIPTIVE NOTE: Interim scientific rept. no. 1, 1 Mar  
83-29 Feb 84.

83 6P

MAR 84 49P

PERSONAL AUTHORS: Joag-Dev, K. ;

PERSONAL AUTHORS: Merkin, L. ;

CONTRACT NO. F49820-82-K-0007

CONTRACT NO. AFOSR-83-0069

PROJECT NO. 2310

PROJECT NO. 2304

TASK NO. A1

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0294

TR-84-0340

UNCLASSIFIED REPORT

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DESCRIPTORS: (U) \*Air flow, Stability, Troposphere,  
Circulation, Topography, Heat

SUPPLEMENTARY NOTE: Pub. in The Annals of Probability,  
v11 n4 p1037-1041, 1983.

Reprint: Independence via Uncorrelatedness under Certain  
Dependence Structures.

IDENTIFIERS: (U) Baroclinic instability, Barotropic  
instability, Atmospheric fields, WUAFOSR2310A1, PE61102F

DESCRIPTORS: (U) \*Probability, Random variables,  
Covariance, Theorems, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A141 350 12/1

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

(U) A Subsonic Flutter Anomaly.

(U) Cascading Bifurcations.

82 4P

83 10P

PERSONAL AUTHORS: Grotberg, J. B. ; Reiss, E. L. ;

PERSONAL AUTHORS: Reiss, E. L. ;

CONTRACT NO. AFOSR-80-0018, NSF-DME81-05822

CONTRACT NO. AFOSR-80-0018

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A4

TASK NO. A4

MONITOR: AFOSR  
TR-84-0373

MONITOR: AFOSR  
TR-84-0372

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Sound and Vibration,  
v80 n3 p444-446 1982.

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. on Applied  
Mathematics, v43 n1 p57-65 Feb 83.

Reprint: A Subsonic Flutter Anomaly.

Reprint: Cascading Bifurcations.

DESCRIPTORS: (U) \*Flutter, Tubular structures, Flexible  
structures, Collapse, Subsonic flow, Anomalies, Velocity,  
Mathematical models, Frequency, Damping, Reprints

DESCRIPTORS: (U) \*Bifurcation(Mathematics), Fluid flow,  
Nonlinear algebraic equations, Perturbations, Reprints

IDENTIFIERS: (U) Critical velocity, Flutter speed,  
PE61102F, WUAFOSR2304A4

IDENTIFIERS: (U) PE61102F, WU2304A4

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 346 12/1

AD-A141 345 12/1

HOWARD UNIV WASHINGTON DC DEPT OF MATHEMATICS

HOWARD UNIV WASHINGTON DC DEPT OF MATHEMATICS

(U) Inclusion Theorems for the Absolute Summability of Divergent Integrals.

(U) New Multiplier Methods for Summing Classical Eigenfunction Expansions.

83 11P

DEC 83 18P

PERSONAL AUTHORS: Diamond, H. ; Kuttner, B. ; Raphael, L. A. ;

PERSONAL AUTHORS: Kon, M. A. ; Raphael, L. A. ;

CONTRACT NO. AFOSR-80-0279, DAAG29-81-G-0011

CONTRACT NO. AFOSR-80-0279, NSF-MCS80-03407

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A4

TASK NO. A4

MONITOR: AFOSR TR-84-0283

MONITOR: AFOSR TR-84-0293

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Canadian Mathematical Bulletin, v26 n4 p389-398 1983.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Differential Equations, v50 n3 p391-406 Dec 83. Sponsored in part by Grant DAAG29-81-G-0011.

Reprint: Inclusion Theorems for the Absolute Summability of Divergent Integrals.

Reprint: New Multiplier Methods for Summing Classical Eigenfunction Expansions.

DESCRIPTORS: (U) \*Integral equations, Boundary value problems, Theorems, Series(Mathematics), Reprints

DESCRIPTORS: (U) \*Analytic functions, Boundary value problems, Theorems, Differential equations, Reprints

IDENTIFIERS: (U) Absolute summability of divergent integrals, Abelian summability, PE61102F, WUAFOSR2304A4

IDENTIFIERS: (U) Eigenfunctions, Summability theory, Multiplier, PE61102F, WUAFOSR2304A4

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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AD-A141 332 12/1 9/3

ROCHESTER UNIV NY DEPT OF CHEMISTRY

MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND STATISTICS

(U) Localized Magnetization Arising from Spin-Dependent Impurity Potentials in the Wolff Model.

(U) On the Instability of the Slotted ALOHA Multiaccess Algorithm.

DEC 83 9P

OCT 83 4P

PERSONAL AUTHORS: LIU, K. C.; Lam, K. S.; George, T. F.;

PERSONAL AUTHORS: Rosenkrantz, W. A.; Towsley, D.;

REPORT NO. UROCHESTER/DC/83/TR-39

CONTRACT NO. AFOSR-82-0167, NSF-ECS79-21140

PROJECT NO. 2303

PROJECT NO. 2304

TASK NO. A2

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0379

TR-84-0303

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physica Status Solidi B, v120 n2 p695-702 Dec 83. Supersedes AD-A133 652.

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Automatic Control, vol-28 n10 p994-998 Oct 83.

Reprint: Localized Magnetization Arising from Spin-Dependent Impurity Potentials in the Wolff Model.

Reprint: On the Instability of the Slotted ALOHA Multiaccess Algorithm.

DESCRIPTORS: (U) \*Magnetization, \*Magnetic moments, \*Alloys, Spin states, Impurities, Dilution, Models, Polarization, Electronic states, Electrons, Conductivity, Mathematical analysis, Iron, Ions, Theory, Scattering, Reprints

DESCRIPTORS: (U) \*Algorithms, Multiple access, Slots, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2

IDENTIFIERS: (U) ALOHA multiaccess algorithm, Martingales, Markov chains, PE61102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 330 9/2

AD-A141 318 10/2

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

(U) A Distributed Operating System for PASM,

(U) Pulsed Power Research Colloquium.

84 10P

DESCRIPTIVE NOTE: Final rept. 15 Sep 77-30 Nov 83.

PERSONAL AUTHORS: Tuomenoksa, D. L. ; Siegel, H. J. ;

FEB 84 14P

CONTRACT NO. AFOSR-78-3581

PERSONAL AUTHORS: Kristiansen, M. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-78-3675

TASK NO. A7

PROJECT NO. 2301

MONITOR: AFOSR  
TR-84-0378

TASK NO. A7

MONITOR: AFOSR  
TR-84-0344

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the Annual Hawaii International Conference on System Sciences (17th), 1984, p69-77.

Reprint: A Distributed Operating System for PASM.

DESCRIPTORS: (U) \*Computer architecture, \*Distributed data processing, \*Parallel processing, Microcomputers, Image processing, Pattern recognition, Reprints

IDENTIFIERS: (U) PASM(Partitioning SIMD/MIMD), PASMOS distributed operating system, PE81102F, WUAFOSR2304A7

UNCLASSIFIED REPORT

ABSTRACT: (U) A Pulsed Power Lecture Series was conducted by Texas Tech University for the U.S. Air Force. Modular instructional material for use in this lecture series was developed. Each module is a self-consistent discussion of some aspect of pulsed power technology. The contents range from the very basic (e.g. basic EM field theory) to advanced, modern topics, such as magnetic switching. The lectures were delivered at the Air Force Institute of Technology and the Air Force Weapons Laboratory during the Academic Year. The speakers then provided a written text of their lecture, which was edited and published in modular form by Texas Tech University. A total of 49 lectures were given and 35 lecture modules were submitted and printed with a possibility of three more to be submitted at a late date. (Author)

DESCRIPTORS: (U) \*Pulse generators, \*Power supplies, Technology forecasting, Research management, Bibliographies, Symposia, Lectures

IDENTIFIERS: (U) Magnetic switching, Modular lectures, Power(Pulsed), PE81102F, WUAFOSR2301A7

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DTIC REPORT BIBLIOGRAPHY

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AD-A141 318 12/1

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

TEXAS UNIV. AT AUSTIN DEPT OF ELECTRICAL ENGINEERING

(U) Mechanism of the Diels-Alder Reaction. Studies of the Addition of Maleic Anhydride to Furan and Methylfurans.

(U) Adaptive Control of Service in Queueing Systems.

JUL 83 9P

NOV 83 8P

PERSONAL AUTHORS: Dewar, M. J. S. ; Pierini, A. B. ;

PERSONAL AUTHORS: Hernandez-Lerma, O. ;

CONTRACT NO. F49620-83-C-0024, NSF-CHE78-03213

CONTRACT NO. AFOSR-79-0025

PROJECT NO. 2303

PROJECT NO. 2304

TASK NO. B2

TASK NO. A1

MONITOR: AFOSR  
TR-84-0329

MONITOR: AFOSR  
TR-84-0298

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 p203-208, 16 Jul 83.

SUPPLEMENTARY NOTE: Pub. in Systems & Control Letters, v3 p283-288 1983.

Reprint: Mechanism of the Diels-Alder Reaction. Studies of the Addition of Maleic Anhydride to Furan and Methylfurans.

Reprint: Adaptive Control of Service in Queueing Systems.

DESCRIPTORS: (U) \*Synthesis(Chemistry), \*Addition reactions, \*Anhydrides, \*Furans, Chemical reactions, Reaction kinetics, Methyl radicals, Transitions, Molecular states, Chemical bonds, Carbon, Symmetry, Reactants(Chemistry), Cyclic compounds, Aromatic compounds, Synchronism, Reprints

DESCRIPTORS: (U) \*Queueing theory, \*Adaptive control systems, Rates, Selection, Parameters, Estimates, Reprints

IDENTIFIERS: (U) \*Diels-Alder reactions, Maleic Anhydride, PE61102F, WUAFOSR230382

IDENTIFIERS: (U) Service rate, PE61102F, WUAFOSR2304A1

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AD-A141 296 12/1

ILLINOIS UNIV AT CHICAGO CIRCLE

(U) A Characterization of a Universally Optimal Design  
within a Class of Block Designs.

84 4P

PERSONAL AUTHORS: Hedayat, A. ;

CONTRACT NO. AFOSR-80-0170

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0380

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Statistical Planning  
and Inference, v9 p143-145 1984.

Reprint: A Characterization of a Universally Optimal  
Design within a Class of Block Designs.

DESCRIPTORS: (U) \*Experimental design,  
\*Matrices(Mathematics), Optimization, Symmetry,  
Information theory, Reprints

IDENTIFIERS: (U) Block design, C matrix, PE81102F,  
WUAFOSR2304A5

AD-A141 268 12/1

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

(U) Exploiting the Limiting Amplitude Principle to  
Numerically Solve Scattering Problems.

82 11P

PERSONAL AUTHORS: Kriegsmann, G. A. ;

CONTRACT NO. N00014-80-C-0196, AFOSR-80-0018

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0369

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Wave Motion, v4 p371-380 1982.

Reprint: Exploiting the Limiting Amplitude Principle to  
Numerically Solve Scattering Problems.

DESCRIPTORS: (U) \*Numerical methods and procedures,  
\*Wave equations, \*Amplitude, Problem solving, Water waves,  
Acoustic waves, Plane waves, Scattering, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4

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SEARCH CONTROL NO. 038187

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NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

(U) Splitting of Steady Multiple Eigenvalues May Lead to  
Periodic Cascading Bifurcation.

JUN 83 13P

PERSONAL AUTHORS: Erneux, T.; Reiss, E. L. ;

CONTRACT NO. N00014-80-C-0198, AFOSR-80-0018

PROJECT NO. 2304

TASK NO. A4

MONITOR AFOSR  
TR-84-0370

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. of Applied  
Mathematics, v43 n3 p613-624 Jun 83.

Reprint: Splitting of Steady Multiple Eigenvalues May  
Lead to Periodic Cascading Bifurcation.

DESCRIPTORS: (U) \*Bifurcation(Mathematics), Eigenvalues,  
Convection, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A4

AD-A141 222 20/2 7/4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Demonstration of the Surface Stability of the Van der  
Waals Surface (0001) of MoSe<sub>2</sub> by Leed and  
Electrochemistry.

84 9P

PERSONAL AUTHORS: Stickney, J. L.; Rosasco, S. D.; Schardt,  
B. C.; Solomon, T.; Hubbard, A. T. ;

CONTRACT NO. AFOSR-81-0149

PROJECT NO. 2303

TASK NO. A1

MONITOR AFOSR  
TR-84-0320

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Surface Science, v136 p15-22  
1984.

Reprint: Demonstration of the Surface Stability of the  
Van der Waals Surface (0001) of MoSe<sub>2</sub> by Leed and  
Electrochemistry.

DESCRIPTORS: (U) \*Single crystals, \*Crystal chemistry,  
\*Surface properties, \*Molybdenum compounds, \*Selenides,  
Surface energy, Surface active substances, Surface  
chemistry, Planar structures, Auger electron spectroscopy,  
Electron diffraction, Reprints

IDENTIFIERS: (U) Van der Waals Force, Molybdenum  
diselenide, LEED(Low Energy Electron Diffraction),  
WUAFOSR2303A1, PE61102F

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AD-A141 220 12/1

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

CLARKSON COLL OF TECHNOLOGY POTSDAM NY DEPT OF  
MATHEMATICS AND COMPUTER SCIEN

(U) Photosensitization via Charge Transfer or Reversible  
Electron Transfer. Oxirane Isomerization and Sulfur  
Dioxide Extrusion.

(U) On the Initial Value Problem of the Second Painleve  
Transcendent.

84 6P

83 24P

PERSONAL AUTHORS: Das, P. K. ; Muller, A. J. ; Griffin, G. W. ;  
Gould, I. R. ; Tung, C. H. ;

PERSONAL AUTHORS: Fokas, A. S. ; Ablowitz, M. J. ;

CONTRACT NO. AFOSR-81-0013

CONTRACT NO. AFOSR-78-3674

PROJECT NO. 2303

PROJECT NO. 2304

TASK NO. B2

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0366

TR-84-0327

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Photochemistry and  
Photobiology, v39 n3 p281-285 1984.

SUPPLEMENTARY NOTE: Pub. in Communications in  
Mathematical Physics, v91 p381-403 1983.

Reprint: Photosensitization via Charge Transfer or  
Reversible Electron Transfer. Oxirane Isomerization and  
Sulfur Dioxide Extrusion.

Reprint: On the Initial Value Problem of the Second  
Painleve Transcendent.

DESCRIPTORS: (U) \*Photochemical reactions, \*Ethylene  
oxide, \*Isomerization, \*Sulfur oxides, \*Extrusion, Charge  
transfer, Electron transfer, Sensitizing, Benzyl radicals,  
Sulfones, Acetonitrile, Solutions (Mixtures),  
Crosslinking (Chemistry), Fluorescence, Cations, Reprints

DESCRIPTORS: (U) \*Boundary value problems,  
\*Transformations (Mathematics), Linearity, Integral  
equations, Homogeneity, Inverse scattering, Reprints

IDENTIFIERS: (U) Oxirane, Benzidine/N,N-Tetramethyl,  
Sulfur dioxide, WUAFOSR2303B2, PE61102F

IDENTIFIERS: (U) Painleve transcendent, Riemann Hilbert  
problem, Fredholm equations, WUAFOSR2304A4, PE61102F

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DTIC REPORT BIBLIOGRAPHY

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AD-A141 212 7/3 7/4

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Subgradient Methods in Deterministic and Stochastic Optimization.

(U) The Laser versus the Lamp: Reactivity of the Diphenyl Ketyl Radical in the Ground and Excited States.

DESCRIPTIVE NOTE: Final rept. Jan 82-Dec 83.

JAN 84 7P

FEB 84 9P

PERSONAL AUTHORS: Rockafellar, R. T. ;

PERSONAL AUTHORS: Baumann, H. ; Merckel, C. ; Timpe, H. J. ; Graness, A. ; Kleinschmidt, J. ;

CONTRACT NO. F49620-82-K-0012

CONTRACT NO. AFOSR-81-0013

PROJECT NO. 2304

MONITOR: AFOSR

TR-84-0331

TASK NO. A6

UNCLASSIFIED REPORT

MONITOR: AFOSR

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters, v103 n6 p497-502, 20 Jan 84.

TR-84-0356

UNCLASSIFIED REPORT

ABSTRACT: (U) This report surveys eleven technical articles and two doctoral theses that were produced under this two-year grant. The work was in the following areas: stochastic programming; subgradient theory; nonlinear programming; and optimal control. (Author)

Reprint: The Laser versus the Lamp: Reactivity of the Diphenyl Ketyl Radical in the Ground and Excited States.

DESCRIPTORS: (U) \*Mathematical programming, \*Optimization, Nonlinear programming, Control theory, Determinants(Mathematics), Stochastic processes, Air Force research

IDENTIFIERS: (U) \*Diphenyl ketyl radicals

IDENTIFIERS: (U) \*Subgradient theory, WUAFOSR2304A6, PE61102F

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DTIC REPORT BIBLIOGRAPHY

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NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

(U) The Stability and Dynamics of Elastic Structures and  
Fluid Flows.

(U) Characterization of Clarke's Tangent and Normal Cones  
in Finite and Infinite Dimensions.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 82-30 Aug 83,

DESCRIPTIVE NOTE: Technical progress rept.,

JAN 84 11P

83 14P

PERSONAL AUTHORS: Reiss, E. L. ;

PERSONAL AUTHORS: Treiman, J. S. ;

CONTRACT NO. AFOSR-80-0018

CONTRACT NO. F49620-82-K-0012

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A4

TASK NO. A6

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0363

TR-84-0352

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The main thrust of this research has been the development and applications of asymptotic and perturbation methods for analyzing the stability and dynamics of elastic structures, fluid flow, and other nonlinear problems; and for problems of scattering of acoustic, electromagnetic and other waves. The work is summarized in the list of papers which have been published, accepted for publication, submitted for publication, or are in preparation for publication. (Author)

SUPPLEMENTARY NOTE: Pub. in Nonlinear Analysis, Theory, Methods and Applications, v7 n7 p771-783 1983.

Reprint: Characterization of Clarke's Tangent and Normal Cones in Finite and Infinite Dimensions.

DESCRIPTORS: (U) \*Scientific literature, \*Bibliographies, \*Abstracts, Fluid flow, Elastic properties, Stability, Fluid dynamics, Perturbations, Nonlinear systems, Scattering, Research management

DESCRIPTORS: (U) \*Tangents, \*Optimization, Banach space, Linearity, Reprints

IDENTIFIERS: (U) Clarks tangent, Tangent cones, WUAFOSR2304A6, PE61102F

IDENTIFIERS: (U) WUAFOSR2304A4, PE61102F

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## UNCLASSIFIED

## JITC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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## WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Tetramesitylcyclodisiloxane: A Cyclic Siloxane with an Unusual Structure.

84

3P

PERSONAL AUTHORS: Fink, M. J. ; Haller, K. J. ; West, R. ; Michl, J. ;

TRACT NO. AFOSR-82-0007, NSF-CHE81-21122

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TP-84-0310

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of American Chemical Society, v106 p822-823 1984.

Reprint: Tetramesitylcyclodisiloxane: A Cyclic Siloxane with an Unusual Structure.

DESCRIPTORS: (U) \*Siloxanes, \*Cyclic compounds, \*Molecular structure, Oxidation, X rays, Crystallography, Crystal structures, Chemical bonds, Reprints

IDENTIFIERS: (U) Siloxane/tetramesitylcycodl, WUAFOSR2303B2, PEB1102F

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## TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Ground States of Molecules. 62. MINDO/3 and MNDO Studies of Some Cheletropic Reactions.

83

12P

PERSONAL AUTHORS: Devar, M. J. S. ; Chantranupong, L. ;

CONTRACT NO. AFOSR-79-0008, NSF-CHE78-03213

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0323

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v105 n24 p7152-7161 1983. See also AD-A141 150.

Reprint: Ground States of Molecules. 62. MINDO/3 and MNDO Studies of Some Cheletropic Reactions.

DESCRIPTORS: (U) \*Elimination reactions, \*Molecular states, \*Ground state, \*Quantum theory, Nitrogen, Carbon monoxide, Transitions, Chemical bonds, Chemical radicals, Dissociation, Parametric analysis, MINDO molecular orbitals, Dienes, Reprints

IDENTIFIERS: (U) \*Cheletropic reactions, MINDO(Modified Intermediate Neglect of Differential Overlap), MNDO(Modified Neglect of Differential Overlap), Diels Alder reactions, Nitrenes, Cyclopentenones, Dienes, WUAFOSR2303BL, PEB1102F

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AD-A141 196 7/4 20/8 7/5

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

SRI INTERNATIONAL MENLO PARK CA

(U) Synthesis of Tetrakis(Perfluorocyclohexyl)methane and Bis(Perfluorocyclohexyl)Difluoromethane by Direct Fluorination.

DESCRIPTIVE NOTE: Final scientific rept. 15 Nov 80-28 Feb 84,

82 3P

PERSONAL AUTHORS: Aikman, R. E.; Lagow, R. J.;

APR 84 131P

CONTRACT NO. AFOSR-78-3658

PERSONAL AUTHORS: Cosby, P. C.;

PROJECT NO. 2303

REPORT NO. SRI-MP-84-057

TASK NO. B2

CONTRACT NO. F49620-81-K-0006

MONITOR: AFOSR

PROJECT NO. 2303

TR-84-0322

TASK NO. B1

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry, v47 p2789-2790 1982.

Reprint: Synthesis of Tetrakis(Perfluorocyclohexyl) Methane and Bis(Perfluorocyclohexyl)Difluoromethane by Direct Fluorination.

DESCRIPTORS: (U) \*Synthesis(CHEMISTRY), \*Methanes, \*Fluorination, Fluorinated hydrocarbons, Stereochemistry, Emulsions, Cyclic compounds, Hexyl radicals, Oxygen, Solubility, Reprints

IDENTIFIERS: (U) Tetraphenylmethane, Methane/Tetrakis(Perfluorocyclohexyl), Difluoromethane/Bis(Perfluorocyclohexyl), WUAFOSR2303B2, PE61102F

## UNCLASSIFIED REPORT

ABSTRACT: (U) Photodissociation of the positive molecular ions of NO, OH, SO, SH, oxygen, and methyl iodide and the doubly-charged molecular ion of nitrogen is observed at visible and ultraviolet laser wavelengths using ion photofragment spectroscopy. The wavelength dependence for the production of photofragments from each of these species reflects highly structured absorption spectra of electronic transitions into predissociated excited states lying in the region of their lowest energy dissociation asymptotes. The absorption spectra, coupled with kinetic energy analysis of the photofragments produced in the dissociations, allow identification of the absorbing and dissociating states in these ions and determination of their molecular constants. (Author)

DESCRIPTORS: (U) \*Molecular ions, \*Photodissociation, \*Photofragment spectroscopy, Visible spectra, Ultraviolet lasers, Cations, Nitrogen, Nitrogen oxides, Hydroxides, Sulfur oxides, Oxygen, Absorption spectra, Kinetic energy, Excitation, Energy transfer

IDENTIFIERS: (U) LPN-SRI-2422, WUAFOSR2303B1, PE61102F

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## UNCLASSIFIED

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AD-A141 188 13/8 7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Experimental and Theoretical Studies of Creep Crack Growth.

(U) Electrodeposition of Silver onto Pt(100) Surfaces Containing Iodine Adlattices. Studies by Low-Energy Electron Diffraction, Auger Spectroscopy, and Thermal Desorption.

DESCRIPTIVE NOTE: Final rept..

MAR 84 146P

84 10P

PERSONAL AUTHORS: Pelloux, R. M.; Bain, K. R.; Bensussan, P.

PERSONAL AUTHORS: Stickney, J. L.; Rosasco, S. D.; Schardt, B. C.; Hubbard, A. T.;

CONTRACT NO. AFOSR-82-0087

CONTRACT NO. AFOSR-81-0149

PROJECT NO. 2306

PROJECT NO. 2303

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0387

TR-84-0318

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) A two part research program was conducted to study the mechanics of creep crack growth in (1) nickel base superalloys as a function of alloy chemistry and test environment at 704 deg C; (2) a high strength aluminum alloy 2219-T851 at 175 deg C. The creep crack growth rate data is reported and analyzed in terms of fracture mechanics parameters. The automated test procedures used for the aluminum alloys are discussed in detail. An iterative model based on creep damage accumulation was derived to predict the creep crack growth rates.

DESCRIPTORS: (U) \*Superalloys, \*High strength alloys, \*Aluminum alloys, \*Nickel alloys, \*Creep, \*Crack propagation, Mathematical prediction, Fractography, Microstructure, Mechanical properties, Heat treatment, Fracture(Mechanics), Stresses, Computations, Geometry, Factor analysis, Test methods, Experimental data

IDENTIFIERS: (U) Aluminum alloy 2219-T851, WUAFOSR2308A1, PEB1102F

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v88 n2 p251-258 1984.

Reprint: Electrodeposition of Silver onto Pt(100) Surfaces Containing Iodine Adlattices. Studies by Low-Energy Electron Diffraction, Auger Spectroscopy, and Thermal Desorption.

DESCRIPTORS: (U) \*Electrodeposition, \*Silver, \*Platinum, \*Electrochemistry, Surfaces, Iodine, Crystal lattices, Single crystals, Electroplating, Electron diffraction, Auger electron spectroscopy, Thermal properties, Desorption, Mass spectroscopy, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303A1

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A141 186

9/2

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Interactive Programming.

DESCRIPTIVE NOTE: Interim technical rept. 1 Oct 82-30 Sep 83.

DEC 83

7P

PERSONAL AUTHORS: Manna, Z. ;

CONTRACT NO. AFOSR-81-0014

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR

TR-84-0297

## UNCLASSIFIED REPORT

ABSTRACT: (U) During this period, research and concentrated on the following topics: (1) Verification of concurrent programs: a proof system (2) Temporal proof system for general languages (3) Proving precedence properties (4) Verification of concurrent programs (5) Synthesis of communicating processes from temporal specifications (6) Special relations in program programming deduction (7) The logical basis for computer programming (8) Reasoning about digital circuits.

DESCRIPTORS: (U) \*Computer program verification, \*Interactions, Computer logic, Programming languages, Invariance, Intercommunication systems, Algorithms, Time dependence, Circuits

IDENTIFIERS: (U) Concurrent programs, Temporal logic, PE61102F, WUAFOSR2304A4

AD-A141 185

4/1

OKLAHOMA UNIV NORMAN DEPT OF PHYSICS AND ASTRONOMY

(U) Ionic Reactions in the Earth's Upper Atmosphere.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 84,

MAR 84

9P

PERSONAL AUTHORS: MILLER, T. M. ;

CONTRACT NO. AFOSR-83-0177

PROJECT NO. 2310

TASK NO. D9

MONITOR: AFOSR

TR-84-0345

## UNCLASSIFIED REPORT

ABSTRACT: (U) Measurements made on the selected-ion flow-tube at the Air Force Geophysics Laboratory on the temperature dependence of several ion-molecule reaction rate coefficients. The  $N(+) + CO$  and  $C(+) + NO$  systems were studied over a range of 9 - 450 K. Measurements were also made on  $C(+) + O_2$ ,  $CO^+ + O_2$ , and  $CO_2^+ + O_2$  over the range 90 - 450 K. Comparison with available earlier results showed agreement within experimental uncertainty. A flowing afterglow apparatus was developed at Oklahoma for the study of ion interactions. Positive-ion/negative ion recombination was studied in this apparatus. Preliminary work was carried out for the  $C12^+ + Cl$  system and photographic documentation is used to determine the strength of the recombination process. (Author)

DESCRIPTORS: (U) \*Ionic current, \*Ionospheric modification, Ion density, Recombination reactions, Ion ion interactions

IDENTIFIERS: (U) PE61102F, WUAFOSR2310D9

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MACKAY SCHOOL OF MINES RENO NV DEPT OF CHEMICAL AND METALLURGICAL ENGINEERING

TEXAS UNIV. AT AUSTIN DEPT OF CHEMISTRY

(U) The Vapor Pressure of Salt-HCl-Water Solutions Below 0C.

(U) Chemical Implications of Sigma Conjugation,

84 16P

DESCRIPTIVE NOTE: Annual rept. 1 Dec 82-30 Nov 83,

PERSONAL AUTHORS: Dewar, M. J. S. ;

JAN 84 11P

CONTRACT NO. F49620-83-C-0024, NSF-CHE78-03213

PERSONAL AUTHORS: Miller, E. ;

PROJECT NO. 2303

CONTRACT NO. AFOSR-82-0049

TASK NO. B2

PROJECT NO. 2308

MONITOR: AFOSR  
TR-84-0330

TASK NO. B1

MONITOR: AFOSR  
TR-84-0343

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 p669-682 1984.

## UNCLASSIFIED REPORT

Reprint: Chemical Implications of Sigma Conjugation.

ABSTRACT: (U) Vapor-liquid equilibria data are presented for hydrochloric acid solutions ranging in nominal HCl mol fraction from 0.110 to 0.225, saturated with CaCl<sub>2</sub>, at nominal solution temperatures between 0 and -40C. Total pressures were measured by capacitance gauges, vapor compositions by direct vapor-phase sampling into a quadrupole mass filter and liquid compositions by electric conductivity. The addition of CaCl<sub>2</sub> to hydrochloric acid breaks the azeotrope and generally increases the vapor pressures of HCl and water. Solubility and solution densities have also been measured. Solution compositions have not been completed to date limiting the interpretation of the results to some extent. These are presently being done. It is probable that the effect of CaCl<sub>2</sub> on the formation of secondary smoke in a reduced smoke rocket plume has less an effect than NaCl.

DESCRIPTORS: (U) \*Vapor pressure, \*Thermochemistry, \*Hydrochloric acid, \*Chemical equilibrium, \*Solutions(Mixtures), Saturation, Calcium compounds, Vapor phases, Liquid phases, Chlorides, Electrical conductivity, Exhaust plumes, Rocket exhaust

IDENTIFIERS: (U) PE61102F, WUAFOSR2308B1

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7/4 20/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY

(U) Carbon Monoxide Adsorption and Desorption on Rh(111) and Rh(331) Surfaces.

DESCRIPTIVE NOTE: Technical rept..

84 17P

PERSONAL AUTHORS: Delouise, L. A.; Winograd, N.;

REPORT NO. TR-4

CONTRACT NO. N00014-83-K-0052, AFOSR-82-0057

MONITOR: AFOSR  
TR-84-0443

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Surface Science, v138 p417-431 1984.

Reprint: Carbon Monoxide Adsorption and Desorption on Rh(111) and Rh(331) Surfaces.

DESCRIPTORS: (U) \*Rhodium, \*Absorption, \*Desorption, \*Carbon monoxide, Surface chemistry, Crystals, Symmetry(Crystallography), X ray photoelectron spectroscopy, Mass spectrometry, Saturation, Bonding, Clustering, Ions, Intensity, Thermal properties, Polycrystalline, Reprints

AD-A141 172

7/4 7/3

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Unimolecular Dissociation Rates of the Chlorobenzene Cation Prepared by Multiphoton Ionization,

MAR 84 11P

PERSONAL AUTHORS: Durant, J. L.; Rider, D. M.; Anderson, S. L.; Proch, F. D.; Zare, R. N.;

CONTRACT NO. F49620-83-C-0033

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0317

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n5 p1817-1825, 1 Mar 84.

Reprint: Unimolecular Dissociation Rates of the Chlorobenzene Cation Prepared by Multiphoton Ionization.

DESCRIPTORS: (U) \*Chlorobenzene, \*Cations, \*Chemical dissociation, \*Reaction kinetics, Molecular properties, Photons, Ionization, Constants, Mass spectrometry, Kinetic energy, Excitation, Reprints

IDENTIFIERS: (U) PE81102F, WJAFOSR2303B1

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OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

GEORGETOWN UNIV WASHINGTON DC DEPT OF CHEMISTRY

(U) Rate Calculations from Time-Dependent Wave Packet Methods: The Relationship of the Pure State and Canonical Total Reaction Probability.

(U) On One-Dimensional Nucleation and Growth of 'Living' Polymers. I. Homogeneous Nucleation.

JAN 84 7P

83 19P

PERSONAL AUTHORS: Agrawal, P. M. ; Agrawal, N. C. ; Viswanathan, R. ; Raff, L. M. ;

PERSONAL AUTHORS: Firestone, M. P. ; de Levie, R. ; Rangarajan, S. K. ;

CONTRACT NO. AFOSR-82-0311

CONTRACT NO. AFOSR-80-0262

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A2

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0325

TR-84-0305

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n2 p760-764 Jan 84.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Theoretical Biology, v104 p535-552 1983.

Reprint: Rate Calculations from Time-Dependent Wave Packet Methods: The Relationship of the Pure State and Canonical Total Reaction Probability.

Reprint: On One-Dimensional Nucleation and Growth of 'Living' Polymers. I. Homogeneous Nucleation.

DESCRIPTORS: (U) \*Computations, \*Wave packets, \*Time dependence, Rates, Theory, Numerical analysis, Reprints

DESCRIPTORS: (U) \*Polymers, \*Polymerization, \*Reaction kinetics, Proteins, Nucleation, Growth(General), One dimensional, Monomers, Addition, Concentration(Chemistry), Mathematical analysis, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 165 4/1 8/14

HAYSTACK OBSERVATORY WESTFORD MA

(U) Ionospheric Signatures of Magnetospheric Convection,

FEB 84 13P

PERSONAL AUTHORS: Foster, J. C. ;

CONTRACT NO. AFOSR-83-0002

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR  
TR-84-0304

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Geophysical Research,  
v89 nA2 p855-865, 1 Feb 84.

Reprint: Ionospheric Signatures of Magnetospheric  
Convection.

DESCRIPTORS: (U) \*Magnetosphere, \*Ionospheric  
modification, Convection, High latitudes, F region,  
Reprints

IDENTIFIERS: (U) Magnetospheric convection, Ionospheric  
signature, PE61102F, WUAFOSR2310A2

AD-A141 162 9/3 20/8

TEXAS A AND M UNIV COLLEGE STATION DEPT OF ELECTRICAL  
ENGINEERING

(U) Interim Report for Grant AFOSR-82-0033.

DESCRIPTIVE NOTE: Rept. for 1 Jan-31 Dec 83,

FEB 84 12P

PERSONAL AUTHORS: Halverson, D. R. ;

CONTRACT NO. AFOSR-82-0033

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0364

UNCLASSIFIED REPORT

ABSTRACT: (U) A number of results were obtained  
pertaining to signal detection and block truncation  
coding for image compression. These results led to  
improved performance over previous approaches, with  
special attention given to methods which required less  
statistical knowledge and which were easier to implement.  
In particular, use of robustness techniques was employed  
to allow the exploitation of whatever knowledge was  
available, while retaining insensitivity to the remaining  
inexactness in knowledge. In addition, because the  
presence of dependency in the underlying random processes  
often complicates detector design, investigations into  
when weak dependency could be ignored were undertaken.  
Finally, some results were obtained which allowed  
relaxing stationarity assumptions which were placed on  
the signal in earlier work. (Author)

DESCRIPTORS: (U) \*Signal processing, \*Image processing,  
\*Data compression, Coding, Truncation, Algorithms,  
Research management, Signal to noise ratio, Noise

IDENTIFIERS: (U) \*Image compression, \*Block truncation  
coding, PE61102F, WUAFOSR2304A5

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMISTRY

(U) Ground States of Molecules. 63. Reverse Cheletropic Reactions in Polycyclic Systems.

(U) The Structure of Tetramethyldistibine,

83 9P

MAR 84 3P

PERSONAL AUTHORS: Dewar, M. J. S.; Chantranupong, L. ;

PERSONAL AUTHORS: Ashe, A. J. , III ; Ludwig, E. G. , Jr. ; Oleksyszyn, J. ; Huffman, J. C. ;

CONTRACT NO. AFOSR-79-0008, NSF-CHE78-03213

CONTRACT NO. AFOSR-81-0099

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B2

TASK NO. B2

MONITOR: AFOSR  
TR-84-0324MONITOR: AFOSR  
TR-84-0306

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v105 p7181-7187 1983.

SUPPLEMENTARY NOTE: Pub in Organometallics, v3 p337-338, 29 Mar 84.

Reprint: Ground States of Molecules. 63. Reverse Cheletropic Reactions in Polycyclic Systems.

Reprint: The Structure of Tetramethyldistibine.

DESCRIPTORS: (U) \*Chemical reactions, \*Polycyclic compounds, \*Ground states, \*MINDO molecular orbitals, Molecules, Molecular states, Electron transitions, Nitrogen, Carbon monoxide, Losses, Boron compounds, Chemical radicals, Thermochemistry, Quantum theory, Reprints

DESCRIPTORS: (U) \*Antimony compounds, \*Hydrides, \*Crystal structure, Methyl radicals, Thermochromic materials, Crystals, Red(Color), Molecular structure, Alignment, Molecule molecule interactions, Liquid phases, Yellow(Color), Melting, Molecular orbitals, Raman spectra

IDENTIFIERS: (U) Cheletropic reactions, MINDO(Modified Intermediate Neglect of Differential Overlap), MINDO(Modified Neglect of Differential overlap), PEG1102F, WUAFOSR2303B2

IDENTIFIERS: (U) PEG1102F, WUAFOSR2303B2

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## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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## TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

## WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Multibond Reactions Cannot Normally Be Synchronous,

(U) The Perethylcyclopolsilanes (Et2Si)4 through (Et2Si)8,

84

14P

83

7P

PERSONAL AUTHORS: Dewar, M. J. S. ;

PERSONAL AUTHORS: Carlson, C. W. ; West, R. ;

CONTRACT NO. AFOSR-79-0008

CONTRACT NO. AFOSR-82-0067

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. AB2

TASK NO. B2

MONITOR: AFOSR  
TR-84-0328MONITOR: AFOSR  
TR-84-0307

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 p209-219 1984.

SUPPLEMENTARY NOTE: Pub. in Organometallics, v2 p1792-1797 1983.

Reprint: Multibond Reactions Cannot Normally Be Synchronous.

Reprint: The Perethylcyclopolsilanes (Et2Si)4 through (Et2Si)8.

DESCRIPTORS: (U) \*Organic compounds, \*Chemical reactions, \*Chemical bonds, Substitution reactions, Addition reactions, Carbon, Atoms, Molecule molecule interactions, Cyclic compounds, Synchronism, Activation energy, Electrochemistry

DESCRIPTORS: (U) \*Polysilanes, \*Photolysis, Ethyl radicals, Cyclic compounds, Chlorine compounds, Chemical reactions, Alkali metals, Lithium, Potassium, Sodium, Nuclear magnetic resonance, Ultraviolet spectroscopy, Mass spectroscopy, Isomers, Reprints

IDENTIFIERS: (U) Diels Adler reactions, PE61102F, WUAFOSR230382

IDENTIFIERS: (U) Sillyenes, Perethylcyclopolsilanes, PE61102F, WUAFOSR230382

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## DTIC REPORT BIBLIOGRAPHY

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MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER  
ENGINEERING

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Vectorized Sparse Elimination.

(U) A New Approach to Database Logic.

DESCRIPTIVE NOTE: Final rept. 1 May 80-30 Apr 84,

DESCRIPTIVE NOTE: Technical rept.,

MAR 84 13P

84 11P

PERSONAL AUTHORS: Calahan, D. A. ;

PERSONAL AUTHORS: Kuper, G. M. ; Vardi, M. Y. ;

CONTRACT NO. AFOSR-80-0158

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A3

TASK NO. A7

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0367

TR-84-0361

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) This grant concerned the case of vector processors such as the CRAY-1 in the solution of sparse systems of equations. The study produced three major classifications of results: (1) Algorithms and related mathematical software for sparse solution on single processors (uniprocessors); (2) Preliminary projection of vector multiprocessor performance on linear algebra codes; and (3) Cooperative work on vector sparse matrix algorithms with AFFDL for CFD and structures codes, and with UC/Berkeley on for circuit simulation.

DESCRIPTORS: (U) \*Sparse matrix, \*Vector analysis, \*Mathematical programming, Equations, Algorithms, Linear algebra, Multiprocessors

IDENTIFIERS: (U) CRAY-1 computers, WUAFOSR2304A3, PE61102F

DESCRIPTORS: (U) \*Mathematical models, \*Data bases, \*Computer logic, Graphs, Formats, Algebra, Semantics, Formulas(Mathematics), Interrogation, Data management

IDENTIFIERS: (U) WUAFOSR2304A7, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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WASHINGTON UNIV ST LOUIS MO DEPT OF MATHEMATICS

CLARKSON COLL OF TECHNOLOGY POTSDAM NY DEPT OF MATHEMATICS AND COMPUTER SCIEN

(U) Generalized Subgradients in Mathematical Programming.

(U) On the Inverse Scattering Transform for the Kadomtsev-Petviashvili Equation.

FEB 83 13P

PERSONAL AUTHORS: Rockafellar, R. T. ;

83 10P

CONTRACT NO. F49620-82-K-0012

PERSONAL AUTHORS: Ablowitz, M. J. ; Yaacov, D. B. ; Fokas, A. S. ;

PROJECT NO. 2304

CONTRACT NO. N00014-78-C-0867, AFDSR-78-3874

TASK NO. A6

PROJECT NO. 2304

MONITOR: AFOSR

TR-84-0336

TASK NO. A4

UNCLASSIFIED REPORT

MONITOR: AFOSR

TR-84-0362

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming. The State of the Art, p369-390 1983.

UNCLASSIFIED REPORT

Reprint: Generalized Subgradients in Mathematical Programming.

SUPPLEMENTARY NOTE: Pub. in Studies in Applied Mathematics, v69 p135-143 1983.

DESCRIPTORS: (U) \*Mathematical programming, Problem solving, Optimization, Nonlinear programming, Reprints

Reprint: On the Inverse Scattering Transform for the Kadomtsev-Petviashvili Equation.

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

DESCRIPTORS: (U) \*Integral equations, \*Linear differential equations, \*Boundary value problems, Inverse scattering, Eigenvectors, Greens function, Reprints

IDENTIFIERS: (U) Kadomtsev Petviashvili equations, PE61102F, WUAFOSR2304A4

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Ring-Insertion and Ring-Opening Reactions of Octaethylcyclotetrasilane.

83

8P

PERSONAL AUTHORS: Carlson, C. W. ; West, R. ;

CONTRACT NO. AFOSR-82-0067

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0313

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v2 n12 p1801-1870 1983.

Reprint: Ring-Insertion and Ring-Opening Reactions of Octaethylcyclotetrasilane.

DESCRIPTORS: (U) \*Polysilanes, \*Cyclic compounds, \*Chemical reactions, Rings, Reaction kinetics, Alkynes, Palladium, Catalysts, Hexenes, Dienes, Isoprene, Silicon, Benzoic acids, Oxidation, Siloxanes, Reprints

IDENTIFIERS: (U) Silylation, PE61102A, WUAFOSR230382

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WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Cis and Trans Isomers of Disilenes. Photochemical and Thermal Interconversions.

84

3P

PERSONAL AUTHORS: Michalczyk, M. J. ; West, R. ; Michl, J. ;

CONTRACT NO. AFOSR-82-0067, NSF-CHE81-21112

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0308

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 p821-822 1984.

Reprint: Cis and Trans Isomers of Disilenes. Photochemical and Thermal Interconversions.

DESCRIPTORS: (U) \*Isomers, \*Silicon compounds, \*Photochemical reactions, \*Thermochemistry, Silanes, Organic compounds, Molecule molecule interactions, Chemical bonds, Photolysis, Cyclic compounds, Reprints

IDENTIFIERS: (U) \*Disilenes, Cis trans isomerism, PE61102F, WUAFOSR230382

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A141 112 11/6 20/11 14/2

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER PITTSBURGH  
PACORNELL UNIV ITHACA NY DEPT OF MATERIALS SCIENCE AND  
ENGINEERING

(U) Superconducting Electronic Film Structures.

(U) Failure by Creep Cracking and Creep Fatigue  
Interaction in Nickel Base Superalloys

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 83

DESCRIPTIVE NOTE: Final technical rept.,

JAN 84 19P

JAN 84 45P

PERSONAL AUTHORS: Braginski, A. I. ;Gavaler, J. R. ;

PERSONAL AUTHORS: Raj, R. ;

REPORT NO. 84-9C9-SUPER-R1

CONTRACT NO. F49620-83-C-0035

PROJECT NO. 2306

MONITOR: AFOSR  
TR-84-0339

TASK NO. C1

UNCLASSIFIED REPORT

MONITOR: AFOSR  
TR-84-0332

## UNCLASSIFIED REPORT

ABSTRACT: (U) Single crystal NbN films were prepared on sapphire having a (2,-1,-1,3) surface orientation. Electron diffraction and Laue data show that the NbN and sapphire orientations are related, proving epitaxial growth. A15 structure V-Si and for the first time A15 Nb-Ge films were prepared reproducibly by a reactive sputtering process. These compounds were formed at temperatures as low as 500 C with critical temperatures above 12K. Niobium films were prepared at less than 100 C with critical temperatures greater than 9K. Epitaxial quality A15 Nb-Ir single crystal substrates were prepared. A new magnetron sputtering system was implemented. Progress on the assembly and implementation of a MBE-type deposition and in situ analytical facility is reported. (Author)

DESCRIPTORS: (U) \*Superconductors, \*Thin films, \*Single crystals, \*Niobium compounds, \*Nitrides, Sapphire, Surfaces, Orientation(Direction), Symmetry(Crystallography), Epitaxial growth, Crystal structure, Germanium, Sputtering, Annealing, Microstructure, Vanadium, Silicon, Josephson junctions

IDENTIFIERS: (U) PEE1102F, WUAFOSR2306C1

ABSTRACT: (U) The objective of this investigation was to study the mechanisms of failure under conditions of creep-fatigue interaction, and creep-crack-growth. The approach was to identify the mechanisms and then develop models for describing failure in terms of the loading variables and the microstructure. In the following sections, the results from each topic are summarized. Further details of the work are available in publications. (Author)

DESCRIPTORS: (U) \*Superalloys, \*Nickel alloy Inconel, \*Failure(Mechanics), \*Cracking(Fracturing), \*Creep tests, Fatigue(Mechanics), Cavities, High temperature, Embrittlement, Crack propagation, Nucleation, Microstructure, Interactions, Mechanical properties, Grain boundaries, Structural properties, Modulus of elasticity, Equations, Computations

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AD-A141 110 7/2 7/4

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Polarized Infrared Spectroscopy of Matrix-Isolated Dimethylsilylene and 1-Methylsilylene.

84

7P

PERSONAL AUTHORS: Arrington, C. A. ; King-Smith, K. A. ; West, R. ; Michl, J. ;

PERSONAL AUTHORS: Rettner, C. T. ; Marintero, E. E. ; Zare, R. N. ;

CONTRACT NO. AFOSR-82-0067

CONTRACT NO. F49620-83-C-0033, N00014-78-C-0403

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B2

TASK NO. B1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0312

TR-84-0321

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the American Chemical Society, v106 n3 p525-530 1984.

SUPPLEMENTARY NOTE: Pub. in Electronic and Atomic Collisions, p51-61 1984.

Reprint: Polarized Infrared Spectroscopy of Matrix-Isolated Dimethylsilylene and 1-Methylsilylene.

Reprint: State-to-State Reaction Dynamics: H D2 Yields HD D.

DESCRIPTORS: (U) \*Silicon compounds, \*Organic compounds, \*Infrared spectroscopy, Methyl radicals, Polarization, Absorption spectra, Photochemical reactions, Glass, Argon, Matrix materials, Chemical bonds, Reprints

DESCRIPTORS: (U) \*Exchange reactions, \*Hydrogen, \*Deuterium, Molecule molecule interactions, Electrons, Atoms, Collisions, Photolysis, Ionization, Mass, Selection, Dynamics

IDENTIFIERS: (U) Dimethylsilylene, Methylsilylene, Silylenes, MND0(Modified Neglect of Differential Overlap), PE61102F, WUAFOSR230382

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1

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CINCINNATI UNIV OH DEPT OF AEROSPACE ENGINEERING AND  
APPLIED MECHANICS

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE

(U) Second Order Composite Velocity Solution for Large  
Reynolds Number Flows.

(U) The Use of Novel Processing Procedures for Improving  
the Overall Fatigue Resistance of High Strength  
Aluminum Alloys.

JAN 84 13P

DESCRIPTIVE NOTE: Annual scientific rept. 1 Jan-31 Dec 83,

PERSONAL AUTHORS: Rubin, S. G. ; Celestina, M. ; Khosla, P. K.

FEB 84 38P

PERSONAL AUTHORS: Starke, E. A. , Jr.;

CONTRACT NO. AFOSR-80-0047

REPORT NO. UVA/525638/MS84/101

PROJECT NO. 2307

CONTRACT NO. AFOSR-83-0061

TASK NO. A1

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR

TR-84-0386

UNCLASSIFIED REPORT

MONITOR: AFOSR  
TR-84-0357

SUPPLEMENTARY NOTE: Pub. in Proceedings of the AIAA  
Aerospace Sciences Meeting (22nd), p1-11, 9-12 Jan 84.

Reprint: Second Order Composite Velocity Solution for  
Large Reynolds Number Flows.

DESCRIPTORS: (U) \*Viscous flow, Transonic flow, Navier  
Stokes equations, Boattail afterbodies, Reynolds number,  
Flow separation, Airfoils, Partial differential equations,  
Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2307A1

ABSTRACT: (U) Its objective is to develop an  
understanding of the mechanisms involved in the  
initiation and propagation of fatigue cracks in metals in  
order to optimize the microstructure of high strength  
aluminum alloys for overall fatigue resistance. The  
research conducted during this year was divided into  
three tasks. Task I was concerned with the effects of  
slip character and grain size on the intrinsic material  
and extrinsic closure contributions to fatigue crack  
growth resistance of 7475. Special thermal mechanical  
processing procedures were developed to control the  
microstructural features of interest. Task II was  
concerned with the use of the cyclic stress strain curve  
and a damage model for predicting fatigue crack growth  
thresholds. Fatigue crack initiation and fatigue crack  
propagation both involve the concept of cyclic  
accumulated damage. The details of the damage structure  
can be related to a material's cyclic stress strain  
response (CSSR). Task III is concerned with the effect of  
ion implantation on the low cycle fatigue response of  
7475. Since fatigue crack initiation is a surface  
phenomenon and fatigue crack propagation is a bulk  
phenomenon, the fatigue properties may be optimized by  
production processes that develop microstructures

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resistant to FCI on the surface, and microstructures resistant to FCP throughout the bulk.

DESCRIPTORS: (U) \*Aluminum alloys, \*Fatigue(Mechanics), \*Crack propagation, Microstructure, Grain size, Aging(Materials), Heat treatment, Stress concentration, Vacuum, Stress strain relations, Cyclic rate, Threshold effects, Ion implantation, Iron alloys, Particle size, Surface reactions

IDENTIFIERS: (U) \*Aluminum alloy 7475, Fatigue resistant alloys, PE61102F, WUAFOSR2306A1

AD-A141 105 7/3 7/5

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Organosilane High Polymers: Electronic Spectra and Photodegradation,

83 8P

PERSONAL AUTHORS: Trefonas,P. , III ;West,R. ;Miller,R. D. ;Hofer,D ;

CONTRACT NO. AFOSR-82-0067

PROJECT NO 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0311

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Polymer Science. Polymer Letters Edition, v21 p823-829 1983.

Reprint: Organosilane High Polymers: Electronic Spectra and Photodegradation.

DESCRIPTORS: (U) \*Polysilanes, \*Electronic states, \*Spectra, \*Photodegradation, Crosslinking(Chemistry), Ultraviolet radiation, Radiation absorption, Absorption spectra, Photolysis, Mathematical analysis, Reprints

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 104 12/1

AD-A141 098 12/1 20/14

WASHINGTON U-IV SEATTLE DEPT OF MATHEMATICS

CLARKSON COLL OF TECHNOLOGY POTSDAM NY DEPT OF  
MATHEMATICS AND COMPUTER SCIEN(U) A Dual Solution Procedure for Quadratic Stochastic  
Programs with Simple Recourse.

DESCRIPTIVE NOTE: Technical progress rept.,

DESCRIPTIVE NOTE: Annual technical rept.,

84 15P

DEC 83 48P

PERSONAL AUTHORS: Rockafellar, R. T. ; Wets, R. J. B. ;

PERSONAL AUTHORS: Ablowitz, M. J. ;

CONTRACT NO. F49620-82-K-0012

CONTRACT NO. AFOSR-78-3674

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A6

TASK NO. A4

MONITOR: AFOSR  
TR-84-0351MONITOR: AFOSR  
TR-84-0392

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Lecture Notes in Math,  
Numerical Methods, n1005 p252-265 1984.Reprint: A Dual Solution Procedure for Quadratic  
Stochastic Programs with Simple Recourse.DESCRIPTORS: (U) \*Quadratic programming, \*Stochastic  
processes, Random variables, Value, Computations,  
Optimization, Finite element analysis, Costs, ReprintsIDENTIFIERS: (U) \*Stochastic programming, Upper bounds,  
WUAFOSR2304A6, PE61102FDESCRIPTORS: (U) \*Nonlinear propagation analysis, \*Wave  
propagation, Applied mathematics, Wave equations, Inverse  
scattering, Transformations (Mathematics), Nonlinear  
differential equations, Integral equations, Optics, Fluid  
mechanics, Boundary value problems

IDENTIFIERS: (U) WUAFOSR2304A4, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 095 8/5

AD-A141 086 12/1

PHYSICAL DYNAMICS INC BELLEVUE WA

CLARKSON COLL OF TECHNOLOGY POTSDAM NY

(U) The Transient Gravity Wave Critical Layer.

(U) Method of Solution for a Class of Multidimensional Nonlinear Evolution Equations.

DESCRIPTIVE NOTE: Annual rept. 10 Feb 83-10 Feb 84.

JUL 83 5P

APR 84 61P

PERSONAL AUTHORS: Dunkerton, T. J. ;

PERSONAL AUTHORS: Fokas, A. S. ; Ablowitz, M. J. ;

REPORT NO. PD-NW-84-310R

CONTRACT NO. N00014-78-C-0867, AFOSR-78-3874

CONTRACT NO. F49620-83-C-0061

PROJECT NO. 2304

PROJECT NO. 2310

TASK NO. A4

TASK NO. A1

MONITOR: AFOSR  
TR-84-0365

MONITOR: AFOSR  
TR-84-0334

UNCLASSIFIED REPORT

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ABSTRACT: (U) Numerical simulations of gravity wave, critical layer interactions are presented, which confirm theoretical predictions of critical layer behavior and explain important features of gravity wave observations in the atmosphere, including momentum deposition and convective wavebreaking. (Author)

Reprint: Method of Solution for a Class of Multidimensional Nonlinear Evolution Equations.

DESCRIPTORS: (U) \*Nonlinear algebraic equations, \*Problem solving, \*Inverse scattering, Boundary value problems, Reprints

DESCRIPTORS: (U) \*Gravity waves, Criticality(General), Layers, Interactions, Numerical analysis, Wave packets, Mathematical models

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A4

IDENTIFIERS: (U) WUAFOSR2310A1, PE81102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 085 12/1 20/14

AD-A141 059 6/20

NORTHWESTERN UNIV EVANSTON IL DEPT OF ENGINEERING  
SCIENCE AND APPLIED MATHEMATICS

COLORADO UNIV AT BOULDER INST OF BEHAVIORAL GENETICS

(U) Low Frequency Scattering by Local Inhomogeneities,

(U) Organophosphate Toxicity: Genetics, Receptors, and  
Antidotes.

AUG 83 13P

DESCRIPTIVE NOTE: Annual progress rept. 15 Sep 82-14 Sep  
83,

PERSONAL AUTHORS: Kriegsmann, G. A. ; Reiss, E. L. ;

NOV 83 44P

CONTRACT NO. N00014-80-C-0198, AFOSR-80-0018

PERSONAL AUTHORS: Collins, A. C. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-82-0300

TASK NO. A4

PROJECT NO. 2312

MONITOR: AFOSR  
TR-84-0368

TASK NO. A3

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. on Applied  
Mathematics, v43 n4 p923-934 Aug 83.Reprint: Low Frequency Scattering by Local  
Inhomogeneities.DESCRIPTORS: (U) \*Applied mathematics, \*Scattering,  
\*Plane waves, Low frequency, Asymptotic series,  
Refractive index, ReprintsIDENTIFIERS: (U) \*Low frequency scattering, Born  
approximation, PE61102F, WUAFOSR2304A4

## UNCLASSIFIED REPORT

ABSTRACT: (U) Studies were completed on the time course  
of the effect of DFP on brain acetylcholinesterase ACH  
activity. While brain ACH activity is maximally depressed  
only 5 minutes after administration, most behavior  
effects require two or more hours before the maximal  
effect is seen. Following a 6.33 mg/kg dose of DFP the  
activity of brain ACH does not return to control levels,  
even after 30 days. This effect is dose-dependent and  
affects all brain regions equally. Behavioral studies as  
well as studies to demonstrate tolerance to DFP have been  
conducted. Pyridine Chemistry has been studied in an  
attempt to develop nicotinic receptor agonists.DESCRIPTORS: (U) Organophosphates, \*Toxicity,  
\*Acetylcholinesterase, Genetics, Antidotes,  
Chemoreceptors, Brain, Dosage, Behavior, Mice, Pyridines

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A3

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A141 058 9/1 20/12

AD-A141 058 CONTINUED

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) High Speed FETs Fabricated in GaAs/AlGaAs Layered Structures Prepared by Molecular Beam Epitaxy.

IDENTIFIERS: (U) Active Interface, Super lattice, Speed, Thin superlattices, Aluminum gallium arsenides

DESCRIPTIVE NOTE: Annual progress rept. 31 Dec 82-31 Dec 83.

JAN 84 111P

PERSONAL AUTHORS: Morkoc, H. ;

CONTRACT NO. F49620-83-K-0021

MONITOR: AFOSR  
TR-84-0404

#### UNCLASSIFIED REPORT

ABSTRACT: (U) The research on modulation doped AlGaAs/GaAs FETs (MODFETs) and on AlGaAs buffer GaAs MESFETs has continued with substantial progress. Current-voltage collapse observed in the drain characteristics of MODFETs in dark at 77K have for the first time been eliminated. The responsible mechanisms were found to relate to the defect concentration in AlGaAs and also to the gate recess width relative to the gate. Microwave S-parameter measurements were also made to deduce the device equivalent circuit parameters and compared to conventional GaAs MESFETs. The results are compared qualitatively to predictions. In GaAs FETs with high resistivity AlGaAs buffer layers it was found that no improvement (relative to GaAs buffer FETs) but degradation can result if the AlGaAs buffer GaAs active layer interface is not of high quality. The only way high quality can be assured has been found to be via the use of a thin superlattice at the heterointerface. Both optical and electrical properties of the GaAs layer grown on this superlattice is of sufficiently high quality to lead the expected improvements in the device performance. With the super lattice AlGaAs/GaAs MESFETs better rf performance has been obtained.

DESCRIPTORS: (U) \*Field effect transistors, \*Epitaxial growth, \*Gallium arsenides, \*Doping, \*Molecular beams, Crystal lattices, Interfaces, Electrical resistance, Equivalent circuits, Electric current, Modulation, Structures, Scalers, Degradation, Voltage, Parameters, Optical properties, Drainage, Thinness, Collapse, Layers

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## DTIC REPORT BIBLIOGRAPHY

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AD-A141 027 7/3 7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE

WASHINGTON STATE UNIV PULLMAN DEPT OF CHEMISTRY

(U) Infrared Nonlinear Processes in Semiconductors.

(U) Structural Electronic Relationships in Polymeric Solids.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 79-30 Nov 83.

DESCRIPTIVE NOTE: Final rept. 1 Oct 79-28 Feb 83.

FEB 84 17P

FEB 83 18P

PERSONAL AUTHORS: Wolff, P. A.; Aggarwal, R. L.; Jagannath, C.; Yuen, S. Y.; Becla, P.;

PERSONAL AUTHORS: Crosby, G. A.;

CONTRACT NO F49620-80-C-0008

CONTRACT NO. AFOSR-80-0038

PROJECT NO. 2308

PROJECT NO. 2303

TASK NO. C2

TASK NO. A3

MONITOR: AFOSR  
TR-84-0383MONITOR: AFOSR  
TR-84-0389

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) The primary purpose of this program was to use nonlinear techniques to study electron dynamics and kinetics in semiconductors. Possible applications of nonlinear interactions were also considered. These investigations have combined theory and experiment. The statement of work for the contract included the following tasks: (A) Study impurity dynamics and electron delocalization in Ge and Si; (B) Generate infrared radiation via coherent excitation of collective modes; (C) Observe and study magnetoacoustic waves; (D) Stimulate plasmon emission in (Hg, Cd)Te; (E) Study spin dynamics and use spins to generate far infrared radiation in (Hg, Cd)Te; (F) Study valley-transfer processes; (G) Characterize (Hg, Cd)Te with optical techniques; and (H) Study semiconductors with field-tunable gap.

DESCRIPTORS: (U) \*Semiconductors, \*Nonlinear systems, \*Infrared radiation, Electrodynamics, Kinetics, Far infrared radiation, Impurities, Magnetoacoustics, Acoustic waves, Optics, Emission, Plasmons

IDENTIFIERS: (U) PEB1102F, WUAFOSR2308C2

DESCRIPTORS: (U) \*Metal complexes, \*Electronic states, Polymers, Charge transfer, Emission, Luminescence, Electrooptics, Molecular states, Osmium, Symmetry, Heterocyclic compounds, Ligands, Ions, Excitation, D2d symmetry were also quantified spectroscopically.

ABSTRACT: (U) The primary objective was to quantify the excited states of metal complexes so that their ultimate roles in photophysical, photochemical, and chemical processes could be assessed. The long-term goal was to arrive at a degree of sophistication such that materials with desired electrooptical properties could be designed at a molecular level and synthesized. A comprehensive study of osmium(II) (5d)6 complexes of D3 symmetry containing N-heterocyclic ligands was completed. The effect of solvents on the interactions of charge-transfer and ligand-field excited states was also quantified. A new series of complexes containing (nd)10 ( $n = 3, 4$ ) filled-shell metal ions was synthesized and studied spectroscopically revealing a new type of low-lying excited state. The structure of a typical example of this class of substances was determined by crystallography. A major accomplishment was the development of a multiple-state model for the lowest excited states of (nd)8 complexes, which was applied to several examples of rhodium(I) and iridium(I) complexes. Compounds of ruthenium(II) with N-heterocyclic tridentate ligands and D2d symmetry were also quantified spectroscopically.

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AD-A140 995 20/5 21/8

Platinum, Iridium, Rhodium, Ruthenium, Electrochemistry,  
Spectroscopy, Crystallography

PHYSICAL SCIENCES INC ANDOVER MA

(U) Experimental and Theoretical Studies of Laser  
Propulsion Phenomenology.

IDENTIFIERS: (U) PE81102F, WJAF05R2303A3

DESCRIPTIVE NOTE: Annual technical rept. 15 Jan 83-29 Feb  
84.

MAR 84 22P

PERSONAL AUTHORS: Rosen, D. ; Weyl, G. ; Kemp, N. ; Ham, D. ;

REPORT NO. PSI-TR-423

CONTRACT NO. F49620-83-C-0039

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR  
TR-84-0385

UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes progress on a research program carried out to investigate and define physical process important to the operation of pulsed and CW laser-heated thrusters. The work performed in this first year effort was divided into three tasks: (1) experimental measurements and quantum kinetic model calculations of the thresholds for laser-induced gas breakdown at visible and near UV wavelengths, (2) preliminary calculations of the spectral/radiant emissions from high temperature ( $T = 10,000$  to  $40,000$  K), high pressure (P approx. 1 to 100 atm) plasmas of hydrogen and nitrogen, and (3) experimental measurements of the high temperature absorption properties of potential molecular seedants for a CW laser-heated thruster operating at lambda approx. 10 microns. The molecular absorption measurements were performed using a low power, line-tunable CO2 probe laser and a shock tube heating apparatus. (Author)

DESCRIPTORS: (U) \*Laser applications, \*Propulsion systems, \*Thrusters, \*Rocket engines, Laser beams, Pulsed lasers, Continuous wave lasers, Heating, Gas breakdown, Plasmas(Physics), Visible spectra, Ultraviolet spectra, Emission spectra, Hydrogen, Nitrogen, Molecules.

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A140 974 7/4 7/2

Absorption, Measurement, Mathematical analysis, Quantum statistics, Kinetic energy, Energy conversion, High temperature

COLORADO UNIV AT BOULDER DEPT OF CHEMISTRY

(U) Innovative Detection, Separation, and Sampling Techniques for Trace Analysis by Gas Chromatography.

IDENTIFIERS: (U) Laser propulsion, WUAFOSR2308A1, PE61102F

DESCRIPTIVE NOTE: Final rept. 1 Oct 79-30 Sep 83,

MAR 84 7P

PERSONAL AUTHORS: Sievers, R. E. ;

CONTRACT NO. AFOSR-80-0011

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR  
TR-84-0384

UNCLASSIFIED REPORT

ABSTRACT: (U) Several studies related to sampling, separation and detection by gas chromatography have been concluded. Fundamental studies and practical applications have been made of selective electron capture sensitization in which the response of an electron capture detector is modified by addition of nitrous oxide to the carrier gas. Sizable signal enhancements have been observed for acetonitrile, acrylonitrile, acrolein, several amines, phenols and polycyclic aromatic hydrocarbons. A selective sorbent has been synthesized and developed that, when used as a chromatographic pre-column, selectively removes and concentrates oxygenates from a sample stream that also contains other organic compounds such as hydrocarbons and chlorinated hydrocarbons. A separation of a complex mixture of metal chelates has been accomplished using a bonded-phase, wall-coated fused silica capillary chromatographic column. Limited success has resulted from attempts to separate optical isomers when a chiral metal chelate is incorporated into a chromatographic stationary phase. (Author)

DESCRIPTORS: (U) \*Gas chromatography, \*Trace elements, Sampling, Separation, Detection, Electron capture, Sensitizing, Adsorbents, Metals, Chelate compounds, Microwaves, Heating, Nitrous oxide, Signals, Selection

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A140 949 6/16

IDENTIFIERS: (U) PEE1102F, WUAFOSR2303A1

EYE RESEARCH INST OF RETINA FOUNDATION BOSTON MA

(U) Eye Movements and Spatial Pattern Vision.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Jan 84,

FEB 84 23P

PERSONAL AUTHORS: Arend, L. E. ;

CONTRACT NO. F49820-83-C-0052

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR  
TR-84-0399

#### UNCLASSIFIED REPORT

ABSTRACT: (U) Spatial patterns became substantially less visible when held stationary (stabilized) on the retina. Calculations showed that residual visibility of stabilized high contrast patterns can be attributed to slight failure of stabilization. Stabilization showed further that eye movements play an important role in detection of drifting and flickering grating patterns. The substantial differences in sensitivity to low-contrast grating patterns of various spatial and temporal frequencies were not observed when apparent contrasts of high-contrast gratings were determined. Approximately equal physical contrasts produced equal apparent contrasts. (Author)

DESCRIPTORS: (U) \*Visual acuity, \*Visual perception, \*Peripheral vision, \*Retina, \*Image motion compensation, Image processing, Information processing, Pattern recognition, Eye movements, Gratings(Spectra), Stationary, Contrast, Threshold effects, Spatial distribution, Display systems

IDENTIFIERS: (U) Parkinje image eyetracker.  
WUAFOSR2313A5, PEE1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 947 7/4 7/5

AD-A140 946 5/10 20/3 6/16

STANFORD UNIV CA DEPT OF CHEMISTRY

NEW YORK UNIV N Y

(U) Theory and Experiments on Chemical Instabilities.

(U) Neuromagnetic Investigation of Workload and Attention.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan-31 Dec 83,

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 83,

DEC 83 28P

JAN 84 17P

PERSONAL AUTHORS: Ross, J. ;

PERSONAL AUTHORS: Kaufman, L. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. F49620-82-K-0014

PROJECT NO. 2303

PROJECT NO. 2313

TASK NO. B1

TASK NO. A4

MONITOR: AFOSR  
TR-84-0390

MONITOR: AFOSR  
TR-84-0397

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was the theoretical and experimental study of chemical instabilities including experimental studies on macroscopic structure formation in chemical periodic precipitation processes, the theory of periodic precipitation processes, light induced bistability in S206F2, dynamic fluctuations in optical bistability, dissipation and control in oscillatory reactions, stochastic theory of nonlinear irreversible processes, experiments on chemical waves, and related topics.

ABSTRACT: (U) The purpose of this project is to measure the brain's magnetic field, and use these data to isolate sources of fields within the brain that are differentially affected by workload and attention. A subsidiary goal is to determine if multiple or single sources underlie components of the event related potential, and to locate these sources. During the current report period progress was made in instrumentation, data handling, and in experiments involving brain activity which was differentially affected by the state of attention of the subject. Modifications of our primary sensing system permitted an improvement in the signal-to-noise ratio by a factor of four. Experiments with this system had a major impact on the design of a multi-sensor array, which will be used on this project this year. A scanner for mapping the field about the head was designed and constructed. Software for handling multi-channel information was created. A means for communicating with a CYBER and a VAX computer for handling large amounts of data was implemented. Experiments revealed that visual attention to a stimulus caused a modulation in background brain activity from the visual cortex at the onset of a 100 msec component of the event related potential. The duration of the modulation depended upon the level of attention. A late 400 msec component in the event related potential has a cortical source in the temporal region. However, the 200 and 300 msec components have deep subcortical sources. Differences in response based on

DESCRIPTORS: (U) \*Chemical reactions, \*Molecular structure, Chemical properties, Stability, Chemical precipitation, Light, Excitation, Sulfur compounds, Oxides, Fluorides, Optical properties, Oscillation, Dissipation, Control, Stochastic processes, Nonlinear systems, Chemicals, Waves, Collids, Electrolytes, Thermodynamics, Photodissociation

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1

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modality and nature of the task are still being studied.  
(Author)

WISCON, IN UNIV-MADISON DEPT OF MATHEMATICS

DESCRIPTORS: (U) \*Workload, \*Attention,  
\*Performance(Human), \*Brain, \*Magnetic fields, Electric  
current, Potential energy, Hippocampus, Instrumentation,  
Data acquisition, Signal to noise ratio, Multisensors,  
Scanners, Mapping, Visual cortex, Stimuli,  
Electroencephalography

(U) Scientific Activities Pursuant to the Provisions of  
AFOSR Grant 79-0018.

DESCRIPTIVE NOTE: Final rept. 1 Nov 81-31 Oct 82,

84 87P

PERSONAL AUTHORS: Russell, D. L. ;

CONTRACT NO. AFOSR-79-0018

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0391

IDENTIFIERS: (U) \*Neuromagnetism, Neuromagnetic response,  
SQUID(Superconducting Quantum Interference Device),  
ERP(Event Related Potential), Brain activity, PE81102F,  
WUAFOSR2313A4

#### UNCLASSIFIED REPORT

ABSTRACT: (U) During the period November 1, 1981 to October 31, 1982, the principal investigator, in co-operation with several research assistants, carried out a program of mathematical research in the general area of control theory of partial differential equations. The program involved two distinct phases: an effort aimed specifically at the development and improvement of control strategies in connection with the wing flutter problem and a more general program in the area of distributed parameter control problems of hyperbolic type. This work resulted in two scientific papers which form the greater part of this report. The first of these, Some Remarks on the Current Status of the Control Theory of Single Space Dimension Hyperbolic Systems, was presented at the NASA JPL Symposium on Control and Stabilization of Large Space Structures, Pasadena, California, July 1982. The second, Admissible Input Elements for Systems in Hilbert Space and a Carleson Measure Criterion, by L.F. Ho and the principal investigator, is a paper which largely resulted from Dr. Ho's thesis work. (Author)

DESCRIPTORS: (U) \*Control theory, \*Partial differential equations, Control systems, Research management, Wings, Flutter simulators, Spacecraft

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A1

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AD-A140 942 12/1 5/2

WISCONSIN UNIV-MADISON DEPT OF MATHEMATICS

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Final Report on Scientific Activities Pursuant to the Provisions of AFOSR Grant 79-0018-A during the Period November 1, 1982 to October 31, 1983.

(U) Multivariate Analysis and Its Applications.

DESCRIPTIVE NOTE: Rept. for 11 Nov 82-31 Oct 83, 83, Interim progress rept. 15 Dec 81-31 Dec 83,

DESCRIPTIVE NOTE: Rept. for 11 Nov 82-31 Oct 83,

OCT 83 110P

DEC 83 15P

PERSONAL AUTHORS: Russell, D. L. ;

PERSONAL AUTHORS: Krishnaiah, P. R. ;

CONTRACT NO. AFOSR-79-0018

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0396

TR-84-0395

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the principal investigator produced two scientific papers entitled, The Dirichlet-Neuman boundary control problem associated with Maxwell's equations in a cylindrical region, and Dual Poles-Wiener spaces and regular nonharmonic Fourier series. These papers are directed toward obtaining a better understanding of distributed parameter control techniques with applications to adaptive control of certain flutter phenomena. This paper summarizes research results in these areas. (Author)

ABSTRACT: (U) A number of topics in multivariate analysis were studied during this period. Technical reports were produced in the following areas -- rejection of multivariate outliers, multivariate gamma distributions and their applications in reliability, testing for positive quadrant dependence in ordinal contingency tables, convexity properties of entropy functions and analysis of diversity, use of diversity and distance measures in the analysis of qualitative data, inference on linear models with fixed effects, limit theorems for the eigenvalues of the sample covariance matrix, concepts of setwise dependence, convexity of bivariate elliptically contoured distributions, admissible linear estimation in singular linear models, standard errors of posterior distributions, and maximum likelihood fitting of STARMAX models to incomplete space-time series data. This report summarizes progress made during this period in these areas. (Author)

DESCRIPTORS: (U) \*Adaptive control systems, \*Control theory, \*Flutter, Maxwell's equations, Electromagnetism, Boundary value problems, Parameters, Fourier series, Research management

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1

DESCRIPTORS: (U) \*Multivariate analysis, \*Reports, \*Abstracts, Distribution, Quadrants, Entropy, Qualitative analysis, Linearity, Mathematical models, Eigenvalues, Covariance, Matrices(Mathematics), Maximum likelihood estimation, Estimates, Fitting functions(Mathematics), Time series analysis

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

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AD-A140 939 CONTINUED

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

IDENTIFIERS: (U) PEB1102F, WUAF0SR2310A2

(U) Research Status and Recommendations from the Alaska Workshop on Gravity Waves and Turbulence in the Middle Atmosphere.

DESCRIPTIVE NOTE: Final rept. 1 Jul 83-30 Jan 84,

JAN 84 37P

PERSONAL AUTHORS: Fritts, D. C. ; Geller, M. A. ; Balsley, B. B. ; Chanin, M. L. ; Hirota, I. ;

CONTRACT NO. AFOSR-83-0218

PROJECT NO. 2310

TASK NO. A2

MONITOR: AFOSR  
TR-84-0388

#### UNCLASSIFIED REPORT

ABSTRACT: (U) Recently, a small group of atmospheric scientists met to discuss gravity wave and turbulence processes in the middle atmosphere. Our objectives were both to review the current theoretical understanding and observational capabilities in this field and to suggest additional studies that would further our knowledge of these processes and their effects on the large-scale circulation of the middle atmosphere. It is hoped that our review and recommendations will be useful in the design of future programs for studies of middle atmosphere dynamics. While our current theoretical understanding of gravity wave and turbulence processes in the middle atmosphere is fairly primitive, it is likely that theoretical and modeling studies will contribute important quantitative information on gravity wave excitation, propagation, and dissipation mechanisms and effects over the next few years. Likewise, our knowledge of gravity wave and turbulence morphology, parameters, and processes will likely expand substantially following the installation, and particularly the combination, of various observing systems. (Author)

DESCRIPTORS: (U) \*Gravity waves, \*Mesosphere, Turbulence, Atmospheric tides, Radar signals, Geophysics, Workshops, Alaska

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## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

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AD-A140 931 12/1 1/1

TEXAS UNIV HEALTH SCIENCE CENTER AT SAN ANTONIO DEPT OF  
PHARMACOLOGY

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION  
AND DECISION SYSTEMS

(U) The Role of Neural Reflexes in Control of the  
Cardiovascular System during Stress.

(U) Status Report on Asymptotic Methods for the Analysis,  
Estimation, and Control of Stochastic Dynamic Systems.

DESCRIPTIVE NOTE: Final progress rept.,

DESCRIPTIVE NOTE: Interim rept. 1 Jan-31 Dec 83.

FEB 84 6P

JAN 84 31P

PERSONAL AUTHORS: Bishop, V. S. ;

PERSONAL AUTHORS: Willisky, A. S. ; Verghese, G. C. ;

CONTRACT NO. AFOSR-78-3857

REPORT NO. LIDS-SR-1355

PROJECT NO. 2312

CONTRACT NO. AFOSR-82-0258

TASK NO. A1

PROJECT NO. 2304

MONITOR: AFOSR  
TR-84-0398

TASK NO. A1

MONITOR: AFOSR  
TR-84-0401

## UNCLASSIFIED REPORT

ABSTRACT: (U) The inhibitory influence of vagal afferents on the cardiovascular systems was determined in studies with anesthetized cats and conscious dogs. Results indicate that vagal afferents exert a tonic influence on vasopressin release in conscious dogs. It was also found that these afferents may play a keen role in the regulation of renin secretory rate during conditions which may alter cardiopulmonary blood volume. A number of studies illustrated the importance of cardiac vagal receptors in the regulation of vascular resistance and the inotropic state of the heart. Data also indicated that cardiac vagal receptors may serve as part of a negative feedback system to regulate sympathetic outflow to the heart. (Author)

DESCRIPTORS: (U) \*Cardiovascular system, \*Inhibitors, \*Stress(Physiology), Renin, Secretion, Pulmonary blood circulation, Feedback, Sympathetic nervous system, Hormones, Blood plasma, Catecholamines

IDENTIFIERS: (U) Vasopressin, Vagal afferents, Vagal receptors, Veratridine, PEB1102F, WUAFOSR2312A1

AD-A140 938

AD-A140 931

## UNCLASSIFIED

## UNCLASSIFIED REPORT

ABSTRACT: (U) The basic scope of this grant is to carry out fundamental research in the analysis, control, and estimation of complex systems, with particular emphasis on the use of methods of asymptotic analysis and multiple time scales to decompose complex problems into interconnections of simpler ones. During the time period covered by this report, significant progress has been made in several areas, leading to important results and to promising directions for further research. The specific topics covered in this report are: Analysis of Systems Possessing Multiple Time Scales; and Control and Estimation.

DESCRIPTORS: (U) \*Asymptotic series, \*Systems analysis, \*Numerical methods and procedures, Dynamics, Stochastic processes, Estimates, Control systems

IDENTIFIERS: (U) PEB1102F, WUAFOSR2304A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL ENGINEERING

MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA  
DEPT OF ELECTRICAL ENGINEERING AND SCIENCE(U) Optimal and Suboptimal Estimation of Nonlinear  
Stochastic Systems.

(U) Statistical Techniques for Signal Processing.

DESCRIPTIVE NOTE: Final rept. 1 Dec 78-30 Nov 83,

DESCRIPTIVE NOTE: Interim scientific rept. 1 Nov 82-31  
Oct 83.

JAN 84 17P

DEC 83 6P

PERSONAL AUTHORS: Marcus, S. I. ;

PERSONAL AUTHORS: Kassam, S. A. ;

CONTRACT NO. AFOSR-79-0025

CONTRACT NO. AFOSR-82-0022

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR

TR-84-0403

MONITOR: AFOSR

TR-84-0394

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) This document describes progress made in a  
number of aspects of nonlinear estimation and nonlinear  
stochastic systems.ABSTRACT: (U) This report describes the results obtained  
during the grant year 1 November 1982 to 31 October 1983.  
References are made to twelve publications produced or in  
preparation. The research supported was in the area of  
robust signal processing, particularly nonlinear  
filtering and smoothing. Results were obtained on  
quantization of filters and on multiple-input robust  
matched filters. Considerable progress was made in the  
area of nonlinear filters and smoothers, where it appears  
that generalizations of median filters may be of  
considerable practical significance in applications such  
as speech and image processing. In addition, some further  
analytical results have been obtained on the statistical  
properties of median filter outputs for Markov models on  
signal-plus-noise. Results on output power spectral  
densities for white inputs have also been obtained for M-  
filters based on robust M-estimation. (Author)DESCRIPTORS: (U) \*Nonlinear systems, \*Stochastic  
processes, Estimates, Optimization, Numerical methods and  
procedures, Algebra, Geometry, Mathematical models,  
Decentralization, Multiple access, Radio broadcasting,  
Adaptive control systems

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A1

DESCRIPTORS: (U) \*Statistical processes, \*Signal  
processing, Mathematical filters, Matched filters, Power  
spectra, Markov processes

IDENTIFIERS: (U) WUAFOSR2304A5, PE81102F

AD-A140 929

AD-A140 906

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 905 12/1

AD-A140 899 12/1

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM THEORY

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Factorization of Linear Systems: A Generalized Framework.

(U) Reasoning about Infinite Computation Paths (Extended Abstract).

83 18P

APR 83 11P

PERSONAL AUTHORS: Hammer, J. ; Heymann, M. ;

PERSONAL AUTHORS: Wolper, P. ; Vardi, M. Y. ; Sistla, A. P. ;

CONTRACT NO. DAAG29-80-C-0050, AFOSR-78-3034

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A2

TASK NO. A6

MONITOR: AFOSR TR-84-0381

MONITOR: AFOSR TR-84-0402

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: Pub. in Linear Algebra and Its Applications, v50 p321-352 1983.

SUPPLEMENTARY NOTE: Pub. in IEEE Computer Data Engineering Conference Proceedings, p185-194 Apr 83.

Reprint: Factorization of Linear Systems: A Generalized Framework.

Reprint: Reasoning about Infinite Computation Paths (Extended Abstract).

DESCRIPTORS: (U) \*Linear systems, \*Factor analysis, Output, Feedback, Compensators, Stability, Reprints

DESCRIPTORS: (U) \*Mathematical logic, Automation, Paths, Computations, Reasoning, Reprints

IDENTIFIERS: (U) WUAFOSR2304A6, PE61102F

IDENTIFIERS: (U) WUAFOSR2304A2, PE61102F

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AD-A140 832 CONTINUED

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Processing and Properties of Airframe Materials.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 83,

FEB 84 51P

PERSONAL AUTHORS: Wert, J. A. ; Ghosh, A. K. ; Chesnutt, J. C. ; Rhodes, C. G. ;

REPORT NO. SC5358.2AR

CONTRACT NO. F49620-83-C-0055

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR  
TR-84-0250

DESCRIPTORS: (U) \*Metals, \*Airframes, \*Structural properties, \*Mechanical properties, Construction materials, Aluminum, Titanium, Fatigue (Mechanics), Plastic deformation, Crack propagation, Cracks, Structural response, Stresses, Recrystallization, Dynamics, Processing, Methodology, Microstructure, Grain size, Annealing, Research management

IDENTIFIERS: (U) PEB1102F, WUAFOSR2306A1

# UNCLASSIFIED REPORT

ABSTRACT: (U) This annual report describes progress during the first year of the three year research program to study the relationship between microstructure and processing conditions, and the effect of processing conditions on the performance of structural airframe materials. Part I of this program is examining the influence of beta processing methods on the interaction of fatigue cracks with the microstructural elements. three beta phase processing methods have been chosen to provide variations in beta phase continuity and alpha phase plate size. The microstructure of the beta processed materials has been quantitatively characterized using SEM, TEM and STEM. Fatigue crack propagation results are also presented for each of the beta annealing treatments. In Part II, the micromechanics of superplastic deformation behavior. Experiments have been performed with 7475 Al having various grain sizes. The flow stress vs strain rate behavior for the mixed grain size materials is best described using the iso-strain rate concept. Observations of dynamic grain growth and dynamic recrystallization have led to new perceptions of how these processes may alter the mechanical response of the materials during superplastic deformation. Based on these observations, the new model of the superplastic deformation process is outlined. (Author)

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AD-A140 803 20/4 20/13 16/3

HOWARD UNIV WASHINGTON DC DEPT OF ELECTRICAL ENGINEERING

CALSPAN ADVANCED TECHNOLOGY CENTER BUFFALO NY

(U) Development of Short Gate FET's.

(U) Studies of Boundary Layer Transition and Surface Roughness Effects in Hypersonic Flow.

DESCRIPTIVE NOTE: Annual rept. Jun 82-Jun 83,

DESCRIPTIVE NOTE: Final rept. 1 Nov 78-30 Sep 82,

DEC 83 20P

OCT 83 180P

PERSONAL AUTHORS: Spencer, M. G. ;

PERSONAL AUTHORS: Holden, M. S. ;

CONTRACT NO. AFOSR-81-0223

REPORT NO. CALSPAN-8430-A-5

PROJECT NO. 2305

CONTRACT NO. F49620-79-C-0003

TASK NO. C1

PROJECT NO. 2307

MONITOR: AFOSR

TR-83-1215

TASK NO. A1

UNCLASSIFIED REPORT

MONITOR: AFOSR  
TR-84-0251

ABSTRACT: (U) Annual results on research for development of short gate FET's is reported. High material purity was obtained on in house liquid phase and vapor phase reactors. Quarter micron metal lines have been fabricated using deep uv lithography. (Author)

UNCLASSIFIED REPORT

ABSTRACT: (U) The first of the studies was a detailed experimental investigation of the effects of the shape and spacing of roughness elements on a maneuverable re-entry vehicle configuration on the roughness-enhanced heating and skin friction. Measurements were made on slender cones and control flaps to define the relationships between roughness-element shape and spacing and the incremental heating and skin friction induced by the surface roughness. It was demonstrated that similar measurements in subsonic flows cannot be directly extrapolated to predict trends in high-speed compressible flows. In the second study, the transition process in the stagnation region of a blunt body in hypersonic flows was examined in detail. The main focus was on determining what fluid-dynamic mechanics are responsible for enhanced heating in the stagnation region of high Reynolds number blunt-body flows. Investigated was whether upstream influence from transition, surface roughness in the stagnation region, minute dust particles interact with the shock layer ahead of a blunt body. The resulting considerable increases in stagnation heating were linked with the shear layers generated by particle-shock/bow-shock interactions and the tripping of the boundary layer in the stagnation region as each dust particle enters it. In the fourth study, microsecond photographs and high-

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frequency thin-film measurements on slender cones were used to examine breakdown of flow in and preceding the hypersonic boundary layer transition region. The results obtained provide insight into the mechanisms by which the laminar/turbulent boundary becomes unstable in high-speed boundary layers.

DESCRIPTORS: (U) \*Turbulent boundary layer, \*Hypersonic flow, \*Boundary layer transition, \*Surface roughness, \*Aerothermodynamics, Spatial distribution, Shape, Skin friction, Maneuverable reentry vehicles, Slender bodies, Aerodynamic heating, Blunt bodies, Boundary layer flow, Stagnation point, Dust, Shock waves, Interactions, Bow shock, Nose cones, Flaps(Control surfaces), Particle size, Heat transfer

IDENTIFIERS: (U) WUAFOSR2307A1, PE81102F

HEBREW UNIV JERUSALEM (ISRAEL) INST OF CHEMISTRY

(U) Syntheses and Characterization of Novel Graphite Intercalation Compounds with Inorganic Fluorides.

DESCRIPTIVE NOTE: Final scientific rept. 15 Sep 82-31 Dec 83,

DEC 83 43P

PERSONAL AUTHORS: Selig,H. ;

CONTRACT NO. AFOSR-80-0187

PROJECT NO. 2308

TASK NO. B2

MONITOR: AFOSR  
TR-84-0263

UNCLASSIFIED REPORT

ABSTRACT: (U) Previous reported intercalation compounds of graphite and xenon fluorides and halogen fluorides were synthesized with HOPG as starting material. While the course of intercalation was followed by in situ measurements such as electrodeless conductivity, c-axis expansion and x-ray diffraction, one of the main objectives of the syntheses was to prepare suitable materials for conducting physical measurements such as those carried out by ongoing projects on those materials sponsored by the USAF. These included studies of thermal properties, vibrational spectroscopy and microstructure. Special attention was devoted to the syntheses of new binary and ternary intercalation compounds of graphite with inorganic fluorides in order to determine by chemical or physical means the chemical species existing in the intercalates. (Author)

DESCRIPTORS: (U) \*Graphite, \*Fluorides, \*Synthesis(Chemistry), Fluorine, Halogens, Xenon, Measurement, Conductivity, Hydrogen fluoride, Sodium compounds, Potassium, Mercury, X ray diffraction, Thermal properties, Vibration, Spectroscopy, Microstructure, Binary compounds, Ternary compounds, Air Force research

IDENTIFIERS: (U) \*Intercalation compounds, WUAFOSR2306B2, PE81102F

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NORTH TEXAS STATE UNIV DENTON DEPT OF PHYSICS

SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Study of VUV Generation by Coherent Resonant Frequency Mixing in Metal Vapors.

(U) Study of the Influence of Metallurgical Factors on Fatigue and Fracture of Aerospace Structural Materials.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 82-31 Oct 83,

DESCRIPTIVE NOTE: Annual scientific rept. 1 Jan-31 Dec 83,

JAN 84 54P

FEB 84 47P

PERSONAL AUTHORS: Diels, J. C. ;

PERSONAL AUTHORS: Lankford, J. ; Davidson, D. L. ; Leverant, G. R. ; Hack, J. E. ;

PROJECT NO. 2301

REPORT NO. SWRI-06-7438

TASK NO. A1

CONTRACT NO. F49620-83-C-0054

MONITOR: AFOSR  
TR-84-0258

PROJECT NO. 2308

UNCLASSIFIED REPORT

TASK NO. A1

ABSTRACT: (U) The properties of multiphoton resonances (two, four or more) are exploited to enhance up-frequency conversion rates. Simultaneously, the property of reversibility of coherent interaction is used to minimize the resonant losses (two-photon, four photon absorption). A source of tunable, near bandwidth limited pulses, of more than a millijoule energy per pulse has been developed. A new scheme of computer controlled data acquisition system made it possible to analyse, for the first time, the temporal coherence properties of the amplified pulses (at a rate of 20 pps). The method of interferometric autocorrelation has been applied to the study of multiphoton coherences. Two photon transmission measurements were performed through a heat pipe containing lithium vapor. (Author)

DESCRIPTORS: (U) \*Pulse amplifiers, \*Dye lasers, \*Phonons, \*Resonant frequency, \*Ionization, Metal vapors, Coherence, Lithium, Pulses, Vacuum ultraviolet radiation, Tunable lasers, High power, Heat pipes, Oscillators, Computer applications, Data acquisition, Interferometry

IDENTIFIERS: (U) WUAFOSR2301A1, PEB1102F

AD-A140 800

AD-A140 659

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UNCLASSIFIED REPORT

ABSTRACT: (U) This report summarizes the results of a two-phase study involving experimental characterization and analytical modeling of fatigue crack tip micromechanics in aerospace structural (Al and Ti) alloys, and identification and modeling of key factors controlling subcritical crack growth and unstable fracture in single crystal nickel-base superalloys. Crack tip opening displacement, the increment of crack advance, and crack tip strain are assumed to be dependent on the formation of slip lines at the crack tip. Slip line length and dislocation density are parameters in the model which are controlled by the microstructure. The model may be used in two ways: to predict the increment of crack growth, if the slip line length is known, or the length of the slip line may be determined if the crack growth increment is measured. Crack tip plasticity data for 7075-T651 is used to evaluate the model, and the results obtained are compatible with the assumptions, and give a value of slip line length which is compatible with the mean free slip length in the material. In the single crystal nickel-base superalloy task, the details of anisotropic fracture mechanics and crack tip stress field solutions have been reviewed.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 659 CONTINUED

AD-A140 595 8/11

DESCRIPTORS: (U) \*Metallurgy, \*Superalloys, \*Fatigue(Mechanics), \*Fracture(Mechanics), \*Crack propagation, \*Structural analysis, Aerospace systems, Nickel alloys, Single crystals, Aluminum alloys, Titanium alloys, Plastic properties, Front ends and surfaces, Factor analysis, Mathematical models, Stress strain relations, Anisotropy, Displacement, Crystallography, Orientation(Direction), Microstructure, Equations, Poisson ratio, Modulus of elasticity, Shear stresses

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF EARTH AND PLANETARY SCIENCES

(U) Effects of Lateral Heterogeneities on the Propagation, Scattering, and Attenuation of the Seismic Waves and the Characterization of the Seismic Source.

DESCRIPTIVE NOTE: Final technical rept., 1 Dec 81-30 Sep 83,

IDENTIFIERS: (U) Aluminum alloy 7075-T651, PE61102F, WUAFOSR2306A1

SEP 83 250P

PERSONAL AUTHORS: AKI,K. ;Toksoz,M. N. ;

CONTRACT NO. F49620-82-K-0004, ARPA Order-4397

PROJECT NO. 2D80

MONITOR: AFOSR  
TR-84-0260

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Doctoral thesis.

ABSTRACT: (U) The work illustrates results obtained in a broad set of applications of a technique of inverting body and surface waveform data for source mechanism and depth. The applications employ a forward model of the P waveform that includes the effects of source radiation pattern described by the zeroth order moment tensor, the effects of several near source and receiver reflections and conversions, and a teleseismic attenuation operator. This general source model has been used by many investigators during the last decade. The original contributions of the present study include investigation tradeoffs in source parameters, optimal parameterizations for extended earthquake sources, improvements in the resolution of parameters through the use of broad band data obtained from digitally recorded records, and illustration of the value of including S waves in the inversion of explosion sources, an illustrations that demonstrate that the body waveforms at some stations cannot be explained by a model of simple propagation in a radially symmetric earth. Inversions of broad band data improve the resolution of source depth, important for source discrimination, and the inclusion of S data generally reduces the non-isotropic components of the moment tensor of an explosion that would be obtained from

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an inversion using only P waves. Amplitude variations of P waves at some seismic stations cannot be simply explained by variations in path attenuation and indicate that multipathing and focusing and defocusing by three-dimensional structure can be important at specific sites.

DESCRIPTORS: (U) \*Seismic waves, \*Earthquakes, Sources, Primary waves(Seismic waves), Secondary waves, Attenuation, Wave propagation, Waveforms, Global

AD-A140 585 18/3 4/1

MISSION RESEARCH CORP SANTA BARBARA CA

(U) Ionospheric Gravity Waves from Nuclear Surface Bursts.

DESCRIPTIVE NOTE: Final rept. 14 Nov 83-31 Jan 84,

MAR 84 67P

PERSONAL AUTHORS: Goldflam,R.;McCartor,G.;Wortman,B.;

REPORT NO. MRC-R-825

CONTRACT NO. F49620-83-C-0034, ARPA Order-4397

PROJECT NO. 2309

TASK NO. A1

MONITOR: AFOSR  
TR-84-0255

UNCLASSIFIED REPORT

ABSTRACT: (U) The rising fireball and the blast wave are investigated as possible sources of atmospheric gravity waves in a stratified medium (isothermal atmosphere) using previously developed methods. Exact and approximate calculations are carried out and the results are compared with observations. We conclude that the blast wave is the predominant source of large amplitude gravity waves.  
(Author)

DESCRIPTORS: (U) \*Ionosphere, \*Gravity waves, \*Nuclear fireball, \*Blast waves, Surface burst, Ionospheric models, Earth atmosphere, Stratification, Wave propagation, Isotherms, Coupling(Interaction), Acoustic waves, Displacement, Low altitude, Nuclear explosion testing, Nuclear explosion detection, High altitude, Hot spots, Yield(Nuclear explosions)

IDENTIFIERS: (U) Rising nuclear fireball, PE6110ZF,  
WUAFOSR2309A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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STANFORD UNIV CA HIGH TEMPERATURE GASDYNAMICS LAB

Interactions, Fluid mechanics, Recombination reactions,  
Air Force research, Electrodes, Space propulsion,  
(U) Fundamental Processes in Partially Ionized Plasmas,  
Propulsion systems, Molecules

DESCRIPTIVE NOTE: Annual scientific rept. 1 Feb 83-31 Jan 84,

IDENTIFIERS: (U) Partially ionized plasmas, PE61102F,  
WUAFOSR2301A8

FEB 84 33P

PERSONAL AUTHORS: Kruger, C. H. ; Mitchner, M. ; Self, S. A. ;

CONTRACT NO. AFOSR-83-0108

PROJECT NO. 2301

TASK NO. A8

MONITOR: AFOSR  
TR-84-0257

#### UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes progress during the first year of a research program on the Fundamental Processes in Partially Ionized Plasmas conducted in the High Temperature Gasdynamics Laboratory at Stanford University. This research is directed to three major areas: recombination in molecular plasmas, discharge effects (plasma electrode interaction) and interaction of discharges and fluid dynamics. Recombination and ionization are fundamental processes that play a role in nearly all applications and natural phenomena that involve partially ionized plasmas. Under the present program, experiments have been designed and theoretical analyses conducted to obtain a better knowledge of the rates of electron recombination in the presence of molecular species. Studies have been initiated of the near-electrode region and the processes by which current is transferred between the plasmas and the electrodes. The first stage of theoretical modeling of the processes has now been completed and published. A study of the interaction of discharges and fluid dynamics has measured the significant secondary flows caused by the interaction of a magnetic field with a current-carrying plasma. Experimental and theoretical research in each of these areas is continuing.

DESCRIPTORS: (U) \*Ionized gases, \*Plasmas(Physics),  
\*Plasma diagnostics, \*Research management, Gas discharges.

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AD-A140 536 6/16

RENSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING

(U) Periodic Thermal Perturbation in a van der Waals Fluid Yield Chaos: A Mel'nikov Function Approach.

(U) Model Emulates Human Smooth Pursuit System Producing Zero-Latency Target Tracking.

DEC 83 3P

83 11P

PERSONAL AUTHORS: Slemrod, M. ;

PERSONAL AUTHORS: Bahill, A. T. ; McDonald, J. D. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-83-0137, NSF-ECS81-21259

TASK NO. A1

PROJECT NO. 2313

MONITOR: AFOSR  
TR-84-0244

MONITOR: AFOSR  
TR-84-0273

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the IEEE Conference on Decision and Control (22nd) p373-374 Dec 83.

Reprint: Periodic Thermal Perturbation in a van der Waals Fluid Yield Chaos: A Mel'nikov Function Approach.

DESCRIPTORS: (U) \*Periodic variations, \*Fluid dynamics, Perturbations, Reprints

IDENTIFIERS: (U) Mel'nikov functions, Van der waals fluids, PEG1102F, WUAFOSR2304A1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Biological Cybernetics, v48 p213-222 1983.

Reprint: Model Emulates Human Smooth Pursuit System Producing Zero-Latency Target Tracking.

DESCRIPTORS: (U) \*Visual targets, \*Tracking, \*Eye movements, Models, Cues(Stimuli), Visual acuity, Man machine systems, Robotics, Reprints

IDENTIFIERS: (U) Zero latency, PEG1102F, WUAFOSR2313A5

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OTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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ILLINOIS UNIV AT URBANA DEPT OF PSYCHOLOGY

UTAH UNIV SALT LAKE CITY DEPT OF METEOROLOGY

(U) Vocal and Manual Reaction Time Estimates of Interhemispheric Transmission Time.

(U) Studies on Light Scattering and Absorption Properties of Ice Clouds for Visible and Infrared Laser Wavelengths.

81 20P

PERSONAL AUTHORS: Bashore, T. R. ;

DESCRIPTIVE NOTE: Final rept. 1 Jun 79-31 Dec 82.

CONTRACT NO. F49620-79-C-0233

AUG 83 39P

PROJECT NO. 2313

PERSONAL AUTHORS: Liou, K. N. ;

TASK NO. A4

CONTRACT NO. F49620-79-C-0198

MONITOR: AFOSR TR-84-0281

PROJECT NO. 2310

TASK NO. A1

UNCLASSIFIED REPORT

MONITOR: AFOSR TR-84-0128

SUPPLEMENTARY NOTE: Pub. in Psychological Bulletin, v89 n2 p352-368 1981.

UNCLASSIFIED REPORT

Reprint: Vocal and Manual Reaction Time Estimates of Interhemispheric Transmission Time.

ABSTRACT: (U) This letter report summarizes the results of experimental evaluations of angular scattering and absorption by ice particles of CO2 laser radiation at 10.8 micrometers wavelength. Experimental results are presented which summarize particle effects such as spontaneous fragmentation and changes in the growth habit. These are compared to model predictions to determine effects upon the backscattered radiation, and polarization. A scattering model is presented which involves complete polarization information for arbitrarily oriented hexagonal columns and plates. It is discussed that a computational technique was developed for randomly oriented hexagonal cylinders and spheroids which show general agreement for phase functions of these geometric sizes and shapes except for the twenty-two and forty-six degree halo features and the backscattering maximum. An attachment to the letter report presents graphed and tabulated data for phase matrix elements for laser wavelengths of .55, .6328, .7, 1.3, 3.8 and 10.6 micrometers based on model calculations. (Author)

DESCRIPTORS: (U) \*Nerve transmission, \*Brain, \*Reaction time, \*Speech, \*Motor reactions, Electrophysiology, Hemispheres, Manual operation, Vision, Stimuli, Variations, Test methods, Parametric analysis, Decision making, Reprints

IDENTIFIERS: (U) Evoked potential, Event related potential

DESCRIPTORS: (U) \*Light scattering, \*Energy absorbers, \*Ice, \*Clouds, \*Computations, Infrared lasers, Long wavelengths, Backscattering, Tables(Data), Illumination, Charts, Polarization

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DTIC REPORT BIBLIOGRAPHY SEARCH, CONTROL NO. 038187

AD-A140 527 20/4 12/1

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BOEING MILITARY AIRPLANE CO SEATTLE WA

Nonequilibrium flow, Equations of motion, Short takeoff aircraft

(U) Multi-Length Scale Turbulence Models.

DESCRIPTIVE NOTE: Final rept. 15 Apr 82-18 Jul 83, IDENTIFIERS: (U) Mixing layers, Elliptic turbulence models, Turbulent mixing, Length scale equations, PEG1102F, WAUFDOSR2307K2

AUG 83 50P

PERSONAL AUTHORS: Birch, S. F. ;

CONTRACT NO. F49620-82-C-0032

PROJECT NO. 2307

TASK NO. K2

MONITOR: AFOSR  
TR-84-0249

#### UNCLASSIFIED REPORT

**ABSTRACT:** (U) Development of a new two-length scale turbulence model is described. This work was undertaken because the performance of current models for certain flows appears to be limited by an inadequate treatment of the turbulence length scale. One flow for which current turbulence models are not adequate is the initial developing region of a plane mixing layer. Available mixing layer data is briefly reviewed. An improved ability to analyze this flow is required for improved predictions of the near field of a jet for a wide range of applications including those for STOL aircraft applications. The work was performed in the context of developing an improved turbulence model for general application to complex three-dimensional jets. The new model is based on the physical observation that the turbulence shear stress and the turbulence energy production are associated primarily with the large scale eddies, while most of the turbulence energy is dissipated by small scale eddies near the high frequency end of the turbulence energy spectrum. Therefore, except for flows close to equilibrium, separate turbulence length scales are required to characterize the large and small scale motions.

**DESCRIPTORS:** (U) \*Turbulence, Mathematical models, Scaling factors, Length, Mixing, Layers, Turbulent flow, Jet flow, Near field, Shear stresses, Jet mixing flow, Three dimensional flow, Eddies(Fluid mechanics).

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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STANFORD UNIV CA DEPT OF MATHEMATICS

LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING AND MECHANICS

(U) Eigenvalues of Slender Cavities and Waves in Slender Tubes.

(U) Theoretical & Experimental Investigation of Coherent Structure in the Turbulent Boundary Layer.

DEC 83 11P

PERSONAL AUTHORS: Geer, J. F. ; Keller, J. B. ;

DESCRIPTIVE NOTE: Final scientific rept. 1 May 78-30 Jun 83.

CONTRACT NO. AFOSR-79-0134

JUN 83 52P

PROJECT NO. 2304

PERSONAL AUTHORS: Smith, C. R. ; Walker, J. D. A. ; Abbott, D. E. ;

TASK NO. A4

CONTRACT NO. F49620-78-C-0071

MONITOR: AFOSR  
TR-84-0238

PROJECT NO. 2307

UNCLASSIFIED REPORT

TASK NO. A2

SUPPLEMENTARY NOTE: Pub. in Jnl. of Acoustical Society of America, v74 n6 p1895-1904 Dec 83.

MONITOR: AFOSR  
TR-84-0248

Reprint: Eigenvalues of Slender Cavities and Waves in Slender Tubes.

UNCLASSIFIED REPORT

DESCRIPTORS: (U) \*Eigenvalues, \*Wave equations, \*Wave propagation, Cavities, Asymptotic normality, Spheres, Reprints

ABSTRACT: (U) This program combines both experimental flow visualization studies with analytical investigations of a series of phenomenological and theoretical models based upon three-dimensional, vortical flow structures developing and interacting in proximity to a solid surface. The experimental program considered a range of sub-problems including the effect of surface modifications on low-speed streak formation and drag, and the effect of vortex loop inter-action with a solid boundary. To augment visual studies, a computerized interface with the video system has been developed which allows quantitative data to be obtained from flow visualization pictures. The specific thrust of the theoretical studies has been focussed on three areas: (1) how two and three-dimensional vortex structures interact with wall boundary layers; (2) the development of a new type of prediction method for two-dimensional turbulent boundary-layer flows; and (3) improvement in numerical techniques for solving parabolic, boundary-layer equations.

IDENTIFIERS: (U) Slender tubes, Slender cavities, PE61102F, WUAFOSR2304A4

DESCRIPTORS: (U) \*Boundary layer flow, \*Turbulent boundary layer, \*Vortices, \*Flow visualization, Mathematical models, Flow fields, Theory, Coherence,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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Three dimensional flow, Two dimensional flow, Walls, Surface properties, Solids, Interactions, Drag, Data displays, Computer graphics, Turbulent flow, Structural properties, Experimental design, Mathematical prediction, Numerical methods and procedures

STANFORD UNIV CA DEPT OF MATHEMATICS

(U) Reflection, Scattering, and Absorption of Acoustic Waves by Rough Surfaces,

DEC 83 9P

IDENTIFIERS: (U) Coherent flow structures,

Streaks(Turbulent flow), PEG1102F, WUAFOSR2307A2

PERSONAL AUTHORS: Watson, J. G. ; Keller, J. B. ;

CONTRACT NO. AFOSR-79-0134

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0239

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Acoustical Society of America, v74 n6 p1887-1894 Dec 83.

Reprint: Reflection, Scattering, and Absorption of Acoustic Waves by Rough Surfaces.

DESCRIPTORS: (U) \*Acoustic waves, \*Surface roughness, Acoustic reflection, Acoustic scattering, Acoustic absorption, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A4

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## DTIC REPORT BIBLIOGRAPHY

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## NEW YORK UNIV NY COURANT INST OF MATHEMATICAL SCIENCES

ILLINOIS UNIV AT URBANA DEPT OF PSYCHOLOGY

(U) Annual Report on Grant AFOSR-80-0228.

(U) Beyond Averaging. II. Single-Trial Classification of Exogenous Event-Related Potentials Using Stepwise Discriminant Analysis.

DESCRIPTIVE NOTE: Rept. for 1 Aug 82-31 Oct 83,

OCT 83 15P

80 16P

PERSONAL AUTHORS: Papanicolaou, G. C. ;

PERSONAL AUTHORS: Horst, R. L. ; Donchin, E. ;

CONTRACT NO. AFOSR-80-0228

CONTRACT NO. F49620-79-C-0235, N00014-78-C-0002

PROJECT NO. 2304

PROJECT NO. 2313

TASK NO. A4

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0290

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the four investigators (two are graduate students) produced five papers and two lecture note series. Titles include, Bounds for effective parameters of heterogeneous media by analytic continuation, Gaussian beams and representation of the Greens function, Convection of microstructure, Diffusive behavior of a random walk in a random medium, Random wave processes, and two lecture note series, Diffusions and random walks in random media, and Macroscopic properties of composites, bubbly fluids, suspensions, and related problems. Work continues on algorithm design for and numerical study of the focusing singularity in nonlinear beams. Work also continues on the modeling of flows with microstructure. This report summarizes progress in these areas during the inclusive dates. (Author)

DESCRIPTORS: (U) \*Mathematics, \*Research management, Schrodinger equation, Numerical analysis, Electric fields, Dielectrics, Composite materials, Bonding, Percolation

IDENTIFIERS: (U) WUAFOSR2304A4, PE81102F

SUPPLEMENTARY NOTE: Pub. in Electroencephalography and Clinical Neurophysiology, v48 p113-128 1980.

Reprint: Beyond Averaging. II. Single-Trial Classification of Exogenous Event-Related Potentials Using Stepwise Discriminant Analysis.

DESCRIPTORS: (U) \*Electroencephalography, \*Discriminate analysis, \*Potential theory, Classification, Accuracy, Reprints

IDENTIFIERS: (U) ERP(Event Related Potentials), Clinical neurophysiology, PE81102F, WUAFOSR2313A4

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SEARCH CONTROL NO. 038187

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CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MATHEMATICS

MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND  
COMPUTER ENGINEERING

(U) A Least Squares Finite Element Scheme for Transonic  
Flow around Harmonically Oscillating Airfoils,

(U) Research in Adaptive Control Hybrid and Constrained  
Structure Systems.

SEP 83 18P

DESCRIPTIVE NOTE: Final scientific rept. 1 May 80-31 Aug  
83,

PERSONAL AUTHORS: Cox, C. L. ; Fix, G. J. ; Gunzburger, M. D. ;

CONTRACT NO. DAAG29-80-C-0081, N00014-81-K-0308

OCT 83 7P

PROJECT NO. 2304

PERSONAL AUTHORS: Djaferis, T. E. ;

TASK NO. A3

CONTRACT NO. AFOSR-80-0155

MONITOR: AFOSR  
TR-84-0289

PROJECT NO. 2304

TASK NO. A1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Computational Physics,  
v51 n3 p387-403 Sep 83. Sponsored in part by Grant AFOSR-  
80-0083 and Contract NAS1-16394.

Reprint: A Least Squares Finite Element Scheme for  
Transonic Flow around Harmonically Oscillating Airfoils.

DESCRIPTORS: (U) \*Finite element analysis. \*Computations,  
\*Transonic flow, Airfoils, Oscillation, Least squares  
method, Variational principles, Equations of motion,  
Approximation (Mathematics), Reprints

IDENTIFIERS: (U) WUAFOSR2304A3, PE81102F

ABSTRACT: (U) Stable Hybrid Model Reference Adaptive  
Control Algorithms are suggested which are then extended  
to deal with the presence of bounded disturbances. The  
question of unmodelled dynamics is also addressed.

Simpler adaptive control algorithms are developed in the  
context of pole placement, by first considering systems  
with known parameters. Such algorithms do not require a  
minimum phase assumption. The foundation is laid for a  
much broader investigation of robust design methods for  
systems with structured uncertainties. (Author)

DESCRIPTORS: (U) \*Algorithms, \*Adaptive control systems,  
Hybrid systems, Research management, Dynamics

IDENTIFIERS: (U) Robust procedures, WUAFOSR2304A1,  
PE81102F

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STANFORD UNIV CA DEPT OF MATHEMATICS

HAWAII UNIV HONOLULU DEPT OF PHYSICS AND ASTRONOMY

(U) Weak Shock Diffraction,

(U) Development and Application of Low Energy X-Ray and Electron Physics.

84 12P

PERSONAL AUTHORS: Hunter, J. K. ; Keller, J. B. ;

DESCRIPTIVE NOTE: Final rept. 1 Oct 78-30 Sep 83,

PROJECT NO. 2304

MAR 84 91P

TASK NO. A4

PERSONAL AUTHORS: Henke, B. L. ;

CONTRACT NO. AFOSR-79-0027

MONITOR: AFOSR

TR-84-0241

PROJECT NO. 2301

UNCLASSIFIED REPORT

TASK NO. A8

SUPPLEMENTARY NOTE: Pub. in Wave Motion, v6 p79-89 1984.

MONITOR: AFOSR  
TR-84-0252

Reprint: Weak Shock Diffraction.

UNCLASSIFIED REPORT

DESCRIPTORS: (U) \*Acoustic waves, \*Diffraction analysis, \*Equations, \*Shock, Nonlinear analysis, Geometry, Wedges, Reprints

ABSTRACT: (U) The objectives and results of this on-going AFOSR program in low-energy x-ray physics are reviewed for the five-year period, 1978-1983. Its thirty major research publications for this period are abstracted. The following applications of this research are discussed: measurement, compilation and calculation of low-energy x-ray optics; high temperature plasma diagnostics. The role of this program in the training of students for x-ray physics and in participating in collaborative research efforts with other laboratories is described. (Author)

IDENTIFIERS: (U) Weak shock, Geometrical acoustics, Acoustic equations, WUAFOSR2304A4, PE61102F

DESCRIPTORS: (U) \*X ray spectroscopy, \*Optics, \*Plasma diagnostics, \*Electron beams, X ray diagnostics, Measurement, Computations, Low energy, X rays, Interactions, Coefficients, Molecular spectroscopy, Solid state physics, Pulses, Spectrometry, Instrumentation, Methodology, High temperature, Microscopes, Telescopes, Synchrotrons, Lithography, Abstracts

IDENTIFIERS: (U) WUAFOSR2301A8, PE61102F

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STANFORD UNIV CA DEPT OF AERONAUTICS AND ASTRONAUTICS

of motion

(U) Coherent Structure Modeling of Viscous Sublayer  
Turbulence for Incompressible Flow with Heat Transfer  
and for Compressible Flow.

IDENTIFIERS: (U) Viscous sublayer, PE61102f,  
WUAFOSR2307A2

DESCRIPTIVE NOTE: Annual scientific rept. no. 2, 1 Jan-31  
Dec 83.

FEB 84 45P

PERSONAL AUTHORS: Ota, D. K. ; Chapman, D. R. ;

REPORT NO. SUDAA-AA-CFD-84-1

CONTRACT NO. AFOSR-82-0083

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR  
TR-84-0248

UNCLASSIFIED REPORT

ABSTRACT: (U) The general objective of the present research is to develop a Navier-Stokes computational model of the time-dependent dynamics and heat transfer in a compressible viscous sublayer. The main objective is to compute the variation of turbulent Prandtl number across the sublayer. Experiments have been unable to define this variation, and existing theories differ greatly. A computational code has been developed using preliminary conditions at the outer edge of the sublayer. Computations have been made for molecular Prandtl numbers from 0.7 to 6 with zero pressure gradient, and for adverse, zero, and favorable pressure gradient, with a Prandtl number of 0.7. These preliminary results show a strong effect of molecular Prandtl number on turbulent Prandtl number near the wall; but only a relatively small effect of pressure gradient throughout the sublayer. Future computations will be made with more refined boundary conditions. (Author)

DESCRIPTORS: (U) \*Incompressible flow, \*Compressible flow, \*Viscous flow, Heat transfer, Turbulence, Navier Stokes equations, Prandtl number, Computations, Equations

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 477 5/10 9/2

ILLINOIS UNIV AT URBANA DEPT OF PSYCHOLOGY

(U) Event-Related Brain Potentials and Subjective Probability in a Learning Task,

80 16P

PERSONAL AUTHORS: Horst, R. ; Johnson, R. , Jr. ; Donchin, E. ;

CONTRACT NO. F49620-79-C-0233, N00014-78-C-0002

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR  
TR-84-0280

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Memory and Cognition, v8 n5  
p476-488 1980.

Reprint: Event-Related Brain Potentials and Subjective Probability in a Learning Task.

DESCRIPTORS: (U) \*Learning, \*Memory(Psychology), \*Perception(Psychology), \*Computer applications, Test and evaluation, Electrodes, Brain, Waveforms, Performance(Human), Computer aided design, Computer aided instruction, Monitoring, Scoring, Group dynamics, Reprints

IDENTIFIERS: (U) ERPs(Event-Related Potentials),  
PE61102F, WUAFOSR2313A4

AD-A140 477

AD-A140 460 12/1

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL ENGINEERING

(U) Priority Assignment in Queueing Systems with Unknown Parameters,

NOV 83 5P

PERSONAL AUTHORS: Hernandez-Lerman, O. ; Marcus, S. I. ;

CONTRACT NO. F49620-77-C-0101, AFOSR-79-0025

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0284

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the IEEE  
Mexicon 83, 4p Nov 83.

Reprint: Priority Assignment in Queueing Systems with Unknown Parameters.

DESCRIPTORS: (U) \*Queueing theory, Parametric analysis, Estimates, Scheduling, Semimarkov processes, Decision making, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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CALIFORNIA UNIV SAN FRANCISCO

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MATHEMATICS

(U) Cell Cycle-Dependent Intervention by Benzamide of Carcinogen-Induced Neoplastic Transformation and in vitro Poly(ADP-Ribosylation) of Nuclear Proteins in Human Fibroblasts.

(U) On Conforming Finite Element Methods for the Inhomogeneous Stationary Navier-Stokes Equations, 83 23P

DEC 83 7P

PERSONAL AUTHORS: Gunzburger, M. D. ; Peterson, J. S. ;

PERSONAL AUTHORS: Kun, E. ; Kirsten, E. ; Milo, G. E. ; Kurian, P. ; Kumari, H. L. ;

CONTRACT NO. AFOSR-80-0083, AFOSR-80-0176

CONTRACT NO. F49620-81-C-0007

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-84-0276

MONITOR: AFOSR TR-84-0287

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the National Academy of Sciences, v80 p7219-7223 Dec 83.

SUPPLEMENTARY NOTE: Pub. in Numerische Mathematik, v42 p173-194 1983.

Reprint: Cell Cycle-Dependent Intervention by Benzamide of Carcinogen-Induced Neoplastic Transformation and in vitro Poly(ADP-Ribosylation) of Nuclear Proteins in Human Fibroblasts.

Reprint: On Conforming Finite Methods for the Inhomogeneous Stationary Navier-Stokes Equations.

DESCRIPTORS: (U) \*Carcinogens, \*Cells(Biology), Neoplasms, In vitro analysis, Fibroblasts, Humans, Proteins, Toxicity, Deoxyribonucleic acids, Reprints

DESCRIPTORS: (U) \*Navier stokes equations, \*Finite element analysis, Stationary, Approximation(Mathematics), Reprints

IDENTIFIERS: (U) \*Benzamide, WUAFOSR2312A5, PE81102F

IDENTIFIERS: (U) WUAFOSR2304A3, PE81102F



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RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF  
PSYCHOLOGY

IDENTIFIERS: (U) Saccades, PE81102F, WUAFOSR2313A5

(U) Eye Movements and Visual Information Processing.

DESCRIPTIVE NOTE: Annual progress rept. 1 Jan-31 Dec 83,

FEB 84 12P

PERSONAL AUTHORS: Kowler, E. ;

CONTRACT NO. AFOSR-82-0085

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR  
TR-84-0279

UNCLASSIFIED REPORT

ABSTRACT: (U) Eye movements determine the location and velocity of the retinal image. Thus, to understand how we see it is necessary to understand both how eye movements are controlled and how they effect visual information processing. The proposed research is concerned with both problems. Specifically: the effect of expectations on smooth eye movements; and the eye moves smoothly in the direction of expected future target motion. Experiments will determine how expectations and guesses about the direction of future motion are formulated and the relative contributions of expectations and retinal image motion to smooth eye movements. The effect of saccades and saccade-like stimulus perturbations on visual information processing: Saccades continually displace the retinal image, yet we see the world as a single coherent picture. Experiments will find out whether the visual system selectively tolerates rapid lateral displacements, or whether the decision to move the eye is required. Programming sequences of saccades: Experiments will show whether sequences of saccades can be pre-programmed, and whether use of such sequences improves performance of visual tasks.

DESCRIPTORS: (U) \*Eye movements, \*Information processing, \*Vision, Retina, Images, Motion, Visual signals, Moving targets, Visual perception, Cues(Stimuli), Psychophysics

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AD-A140 436 5/1 12/1 20/10

DELAWARE UNIV NEWARK DEPT OF MATHEMATICAL SCIENCES

UTAH UNIV SALT LAKE CITY DEPT OF PHYSICS

(U) Uniqueness Theorems for the Inverse Problem of Acoustic Scattering.

(U) Quantum Solutions and Strange Solutions in Many-Body Problems.

83 8P

DESCRIPTIVE NOTE: Final rept. 1 Jul 81-31 May 83,

PERSONAL AUTHORS: Colton, D. ; Sleeman, B. D. ;

JUL 83 6P

CONTRACT NO. AFOSR-81-0103

PERSONAL AUTHORS: Mattis, D. C. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-80-0257

TASK NO. A4

PROJECT NO. 2304

MONITOR: AFOSR  
TR-84-0237

TASK NO. A4

MONITOR: AFOSR  
TR-84-0242

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IMA Jnl. of Applied Mathematics, v31 p253-259 1983.

UNCLASSIFIED REPORT

Reprint: Uniqueness Theorems for the Inverse Problem of Acoustic Scattering.

ABSTRACT: (U) A summary is given of research accomplished and papers written under this grant. The research covered statistical and many-body theoretical physics, especially, new mathematical techniques for solving problems. (Author)

DESCRIPTORS: (U) \*Inverse scattering, \*Acoustic waves, \*Acoustic scattering, Theorems, Scattering cross sections, Far field, Reprints

DESCRIPTORS: (U) \*Research management, \*Quantum statistics, \*Statistical mechanics, \*Reports, Mathematical analysis, Problem solving

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A4

IDENTIFIERS: (U) Many body problems, WUAFOSR2304A4, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 417 12/1

AD-A140 418 12/1

BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF MATHEMATICS

(U) Approximating Multiple ITO Integrals with 'Band Limited' Processes.

(U) On Finite Element Approximations of Problems Having Inhomogeneous Essential Boundary Conditions.

DESCRIPTIVE NOTE: Technical rept..

83 15P

OCT 83 32P

PERSONAL AUTHORS: Fix, G. J. ; Gunzburger, M. D. ; Peterson, J. S. ;

PERSONAL AUTHORS: Kushner, H. J. ; Huang, H. ;

CONTRACT NO. DAAG29-80-C-0081, AFOSR-80-0083

REPORT NO. LCDS-83-24

PROJECT NO. 2304

CONTRACT NO. N00014-78-C-0279, AFOSR-81-0116

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0285

MONITOR: AFOSR  
TR-84-0288

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grants NSF-ECS81-05978 and NSF-ECS82-11476.

SUPPLEMENTARY NOTE: Pub. in Comp. & Maths. with Appls., v9 n5 p687-700 1983.

ABSTRACT: (U) This paper is concerned with the problem of the approximation of Ito integrals using band limited processes. The problem is treated in the context of the theory of weak convergence of measures and the correction terms exhibited. The method is such that the conditions used can readily be weakened. An application to a likelihood functional and hypothesis testing problem is given. There, the weak convergence result (rather than mere convergence of finite dimensional distributions) is essential if the limit approximation is to make sense as an approximation to the likelihood functional. The correction terms depend only on the limit (as epsilon approaches limit of 0) of the correlation function of the (renormalized)  $n$  sub epsilon.

Reprint: On Finite Element Approximations of Problems Having Inhomogeneous Essential Boundary Conditions.

DESCRIPTORS: (U) \*Finite element analysis, \*Boundary value problems, Partial differential equations, Linear differential equations, Navier Stokes equations, Reprints

IDENTIFIERS: (U) Elliptic equations, PE61102F, WUAFOSR2304A3

DESCRIPTORS: (U) \*Integrals, \*Approximation(Mathematics), Weak convergence, Vector analysis, Correlation, Broadband, Noise, Mathematical filters

IDENTIFIERS: (U) Ito integrals, Noise models, PE61102F, WUAFOSR2304A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 412 12/1

AD-A140 411 7/4

RENSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY

(U) Controllability for Distributed Nondiagonal Bilinear Systems,

(U) Rates of Intramolecular Conversions over Low Barriers.  
DESCRIPTIVE NOTE: Final rept. 1 Dec 79-31 Dec 83,

DEC 83 5P

MAR 84 13P

PERSONAL AUTHORS: Stenrod, M. ;

PERSONAL AUTHORS: Bauer, S. H. ; Rosenberg, A. ; Lazaar, K. I.

CONTRACT NO. AFOSR-81-0172

CONTRACT NO. AFOSR-80-0046

PROJECT NO. 2304

PROJECT NO. 2303

TASK NO. A1

TASK NO. B1

MONITOR: AFOSR  
TR-84-0245

MONITOR: AFOSR  
TR-84-0261

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the IEEE Conference on Decision & Control (22nd), p910-912 Dec 83.

ABSTRACT: (U) The product developed under this grant is a series of research reports, two of which have been published, one has been accepted for publication, two have been recently submitted for publication, and one has yet to be completed. Their contents is best summarized by quoting the abstracts of these manuscripts. Topics discussed include: Intramolecular Unsymmetrical Oho Bonds. Thermochemistry; Second Order Rate Constants for Intramolecular Conversions: Application to Gas-Phase NMR Relaxation Times; Intramolecular Conversion Rates Over Low Barriers II. The Alkyl Nitrites; Intermolecular Conversion Over a Low Barrier, III. Gas-Phase NMR Studies of an H-Bond Association; Conversions Over Low Barriers IV. Studies of Formic, Acetic and Thioformic Acids; and Conversions Over Low Barriers. V. The Acetyl-Acetones (Gas Phase).

Reprint: Controllability for Distributed Nondiagonal Bilinear Systems.

DESCRIPTORS: (U) \*Linear systems, \*Control, Operators(Mathematics), Hilbert space, Reprints

IDENTIFIERS: (U) \*Distributed Bilinear systems, PE81102F, WUAFOSR2304A1

DESCRIPTORS: (U) \*Reaction kinetics, \*Molecule molecule interactions, Molecular vibration, Relaxation, Vapor phases, Nuclear magnetic resonance, Isomerization, Oxygen, Hydrogen, Chemical bonds, Thermochemistry, Constants, Conversion, Barriers, Alkyl radicals, Nitrides, Molecular association, Formic acid, Acetic acid, Acetones

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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AD-A140 398 12/1

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL  
ENGINEERING

FLORIDA UNIV GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM  
THEORY

(U) Frequency Limitations and Optimal Step Size for the  
Two-Point Central Difference Derivative Algorithm with  
Applications to Human Eye Movement Data.

(U) Stability and Nonsingular Stable Precompensation: An  
Algebraic Approach.

MAR 83 5P

83 33P

PERSONAL AUTHORS: Bahill, A. T. ; McDonald, J. D. ;

PERSONAL AUTHORS: Hammer, J. ;

CONTRACT NO. AFOSR-83-0137

CONTRACT NO. DAAG29-80-C-0050, AFOSR-78-3034

PROJECT NO. 2313

PROJECT NO. 2304

TASK NO. A5

TASK NO. A8

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0275

TR-84-0243

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on  
Biomedical Engineering, VBME-30 n3 p181-194 Mar 83.

SUPPLEMENTARY NOTE: Pub. in Mathematical Systems Theory,  
v16 p265-298 1983.

Reprint: Frequency Limitations and Optimal Step Size for  
the Two-Point Central Difference Derivative Algorithm  
with Applications to Human Eye Movement Data.

Reprint: Stability and Nonsingular Stable Precompensation:  
An Algebraic Approach.

DESCRIPTORS: (U) \*Algorithms, \*Derivatives(Mathematics),  
\*Eye movements, Low pass filters, Accuracy, Frequency  
response, Reprints

DESCRIPTORS: (U) \*Linear systems, \*Linear algebra,  
Matrices(Mathematics), Stability, Reprints

IDENTIFIERS: (U) Two point central difference algorithm

IDENTIFIERS: (U) Precompensation, PE81102F,  
WUAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 395 20/4 12/1

AD-A140 394 12/1

STANFORD UNIV CA DEPT OF MATHEMATICS

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF MATHEMATICS

(U) Breaking of Liquid Films and Threads,

(U) Remarks on the Preservation of Various Controllability Properties under Sampling,

DEC 83 4P

PERSONAL AUTHORS: Keller, J. B. ;

83 16P

CONTRACT NO. AFOSR-79-0134

PERSONAL AUTHORS: Sontag, E. D. ;

PROJECT NO. 2304

CONTRACT NO. AFOSR-80-0196

TASK NO. A4

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A6

TR-84-0240

MONITOR: AFOSR

TR-84-0236

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physics of Fluids, v28 n12 p3451-3453 Dec 83.

UNCLASSIFIED REPORT

Reprint: Breaking of Liquid Films and Threads.

SUPPLEMENTARY NOTE: Pub. in Dev. et Util. d'Outils et Modeles Math. en Anal. de Systemes, p623-637 1983. Abstract in French.

DESCRIPTORS: (U) \*Liquids, \*Films, \*Equations of motion, Bubbles, Nonuniform, Thickness, Hydrodynamics, Computations, Holes(Openings), Reprints

Reprint: Remarks on the Preservation of Various Controllability Properties under Sampling.

IDENTIFIERS: (U) \*Liquid films, PE61102F, WUAFOSR2304A4

DESCRIPTORS: (U) \*Control theory, \*Nonlinear systems, Sampling, Geometry, France, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 390 6/16 20/6

AD-A140 389 20/6 6/16

DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)

DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)

(U) Texture Changes versus Size Changes as Stimuli for Motion in Depth.

(U) Spatial-Frequency Discrimination and Detection: Comparison of Postadaptation Thresholds.

83 14P

DEC 83 10P

PERSONAL AUTHORS: Beverley, K. I. ; Regan, D. ;

PERSONAL AUTHORS: Regan, D. ; Beverley, K. I. ;

CONTRACT NO. AFOSR-78-3711

CONTRACT NO. AFOSR-78-3711

PROJECT NO. 2313

PROJECT NO. 2313

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR TR-84-0277

MONITOR: AFOSR TR-84-0268

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Vision Research, v23 n12 p1387-1400 1983.

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Optical Society of America, v73 n12 p1684-1690 Dec 83.

Reprint: Texture Changes versus Size Changes as Stimuli for Motion in Depth.

Reprint: Spatial-Frequency Discrimination and Detection: Comparison of Postadaptation Thresholds.

DESCRIPTORS: (U) \*Visual perception, \*Images, Texture, Sizes(Dimensions), Motion, Reprints

DESCRIPTORS: (U) \*Visual perception, \*Sine waves, Discrimination, Detection, Cathode ray tubes, Threshold effects, Motor neurons, Reprints

IDENTIFIERS: (U) Motion in depth, PE81102F, WUAFOSR2313A5

IDENTIFIERS: (U) Spatial frequency, PE81102F, WUAFOSR2313A5

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 385 12/1 5/10

AD-A140 381 11/8 20/11 14/2

CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL  
ENGINEERING

SRI INTERNATIONAL MENLO PARK CA

(U) Zero-Latency Tracking of Predictable Targets by Time-  
Delay Systems,

(U) Dynamic Fracture Behavior of Structural Materials.

DESCRIPTIVE NOTE: Annual rept. no. 3, Feb 83-Feb 84,

83 15P

MAR 84 17P

PERSONAL AUTHORS: Bahill, A. T.; McDonald, J. D. ;

PERSONAL AUTHORS: Shockey, D. A.; Giovanola, J. H. ;

CONTRACT NO. AFOSR-83-0137, NSF-ECS81-21259

CONTRACT NO. F49620-81-K-0007

PROJECT NO. 2313

PROJECT NO. 2306

TASK NO. D9

TASK NO. K1

MONITOR: AFOSR  
TR-84-0264MONITOR: AFOSR  
TR-84-0262

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Jnl. of Control,  
v38 n4 p881-893 1983.ABSTRACT: (U) Structures used by the U.S. Air Force must  
be designed to resist catastrophic fracture when  
subjected to dynamic loads. For example, aircraft  
components may experience short stress pulses from  
airborne debris, military projectiles, or intense bursts  
of laser or x-ray radiation. Landing gear and aircraft  
retaining cables on carrier ships experience dynamic  
loads at the end of each flight. A related dynamic  
fracture problem concerns rapidly running cracks. For  
example, it is often desirable to know whether a crack,  
once initiated, will arrest before it reaches a component  
boundary and thereby preserve the integrity of the  
structure. Thus, to ensure safe design of Air Force  
structures, it is necessary to have a knowledge of the  
dynamic fracture behavior of the component materials. The  
research being conducted in this program is aimed at  
improving our understanding of dynamic fracture. Emphasis  
is on the accurate characterization of material  
resistance to crack initiation under dynamic loading (K  
sub Id measurements) and to rapid crack propagation (K  
sub Id measurements). This annual report reviews the  
specific program objectives and summarizes the progress  
during the third research year.Reprint: Zero-Latency Tracking of Predictable Targets by  
Time-Delay Systems.DESCRIPTORS: (U) \*Mathematical models, \*Motor reactions,  
\*Tracking, Predictions, Adaptive control systems, Eye,  
Man machine systems, Targets, ReprintsIDENTIFIERS: (U) Target tracking, PE81102F,  
WUAFOSR2313D9DESCRIPTORS: (U) \*Alloys, \*Crack propagation,  
\*Fracture(Mechanics), \*Charpy impact tests,  
\*Fatigue(Mechanics), \*Structural properties, Dynamic  
loads, Toughness, Stability, Cadmium compounds, Cadmium

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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sulfides, Construction materials, Thin films, Substrates,  
Tensile properties, Temperature, Light pulses, Lasers

NEW HAMPSHIRE UNIV DURHAM VISION RESEARCH LAB

(U) Two-Criterion Threshold Techniques: Evidence for  
Separate Spatial and Temporal Mechanisms?

IDENTIFIERS: (U) WUAFOSR2306K1, PE61102F

83 8P

PERSONAL AUTHORS: Panish, S. C. ; Swift, D. J. ; Smith, R. A. ;

CONTRACT NO. AFOSR-80-0045

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR  
TR-84-0233

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Vision Research, v23 n12  
p1519-1525 1983.

Reprint: Two-Criterion Threshold Techniques: Evidence for  
Separate Spatial and Temporal Mechanisms?

DESCRIPTORS: (U) \*Visionics, \*Threshold effects, Flicker,  
Drift, Reprints, Great Britain

IDENTIFIERS: (U) Spatial frequency, WUAFOSR2313A5,  
PE61102F

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AD-A140 379 6/16

AD-A140 362 20/5 20/8

SMITH-KETTLEWELL INST OF VISUAL SCIENCES SAN FRANCISCO CALIF

NEW MEXICO UNIV ALBUQUERQUE INST FOR MODERN OPTICS

(U) The Detection of Motion in the Peripheral Visual Field,

(U) Investigations of Vacuum Ultraviolet and Soft X-Ray Lasers.

84 10P

DESCRIPTIVE NOTE: Final rept. 15 May 82-14 May 83,

PERSONAL AUTHORS: McKee, S. P.; Nakayama, K.;

MAR 84 71P

CONTRACT NO. AFOSR-82-0345, PHS-P-30-EY-01186

PERSONAL AUTHORS: Elci, A.;

PROJECT NO. 2313

CONTRACT NO. AFOSR-81-0128

TASK NO. A5

PROJECT NO. 2301

MONITOR: AFOSR TR-84-0274

TASK NO. A8

MONITOR: AFOSR TR-84-0254

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Vision Research, v24 n1 p25-32 1984.

Reprint: The Detection of Motion in the Peripheral Visual Field.

DESCRIPTORS: (U) \*Peripheral vision, \*Visual perception, Motion, Detection, Visual acuity, Measurement, Fovea, Threshold effects, Reprints

IDENTIFIERS: (U) WUAFOSR2313A5, PE81102F

UNCLASSIFIED REPORT

ABSTRACT: (U) The regimes in which an X-ray free electron laser can be operated are discussed. One possible use of an X-ray laser to nuclear spectroscopy is described. Intense field effects on nuclear beta decay are analyzed. (Author)

DESCRIPTORS: (U) \*Laser applications, \*Soft x rays, \*Ultraviolet radiation, Ion exchange, Free electrons, Vacuum, Kinematics, Ionization, Beta decay

IDENTIFIERS: (U) \*X-ray lasers, Soft x-ray lasers, Nuclear spectroscopy, WUAFOSR2301A8, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 360 6/1

AD-A140 359 6/16 5/10

ILLINOIS UNIV AT CHICAGO CIRCLE

DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)

(U) Guanosine Triphosphate Activation of Brain Adenylate Cyclase: Enhancement by Long-Term Antidepressant Treatment.

(U) Spatial Frequency Mechanisms in Human Vision Investigated by Evoked Potential Recording.

JAN 83 5P

PERSONAL AUTHORS: Regan, D. ;

PERSONAL AUTHORS: Menkes, D. B. ; Rasenick, M. M. ; Wheeler, M. A. ; Bitensky, M. W. ;

CONTRACT NO. AFOSR-80-0181

CONTRACT NO. AFOSR-83-0249

PROJECT NO. 2313

PROJECT NO. 2312

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR  
TR-84-0269

MONITOR: AFOSR

TR-84-0268

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Science, v219 p65-67, 7 Jan 83.

SUPPLEMENTARY NOTE: Pub. in Vision Research, v23 n12 p1401-1407 1983. Presented at the ARVD meeting, May 83 Sarasota.

Reprint: Guanosine Triphosphate Activation of Brain Adenylate Cyclase: Enhancement by Long-Term Antidepressant Treatment.

Reprint: Spatial Frequency Mechanisms in Human Vision Investigated by Evoked Potential Recording.

DESCRIPTORS: (U) \*Guanosine, \*Phosphates, \*Adenyl cyclase, Brain, Membranes(Biology), Activation, Sensitivity, Reprints

DESCRIPTORS: (U) \*Vision, \*Electrophysiology, \*Electroencephalography, Spatial distribution, Frequency, Stimulation(Physiology), Eye, Sine waves, Gratings:(Spectra), Patterns, Attenuation, Bandwidth, Masking Contrast

IDENTIFIERS: (U) Neurotransmitters, WUAFOSR2312A5, PE61102F

IDENTIFIERS: (U) \*Evoked potential, PE61102F, WUAFOSR2313A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A140 356 6/18 5/10

CALIFORNIA UNIV SANTA BARBARA INST OF ENVIRONMENTAL  
STRESS

SALK INST SAN DIEGO CALIF

(U) Persistent Myocardial Ischemia Following Chronic  
Hyperoxia in Conscious Dogs,

(U) The Function of Dream Sleep,

NOV 83 10P

JUL 83 5P

PERSONAL AUTHORS: Crick, F. ; Mitchison, G. ;

PERSONAL AUTHORS: Borgia, J. F. ; Horvath, S. M. ; Sorich, R.  
A. ;

CONTRACT NO. AFOSR-82-0042

CONTRACT NO. AFOSR-78-3534, PHS-RR0-7099

PROJECT NO. 2312

PROJECT NO. 2312

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR  
TR-84-0232

MONITOR: AFOSR  
TR-84-0265

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in the Jnl. of Thoracic and  
Cardiovascular Surgery, v86 n5 p710-717 Nov 83.

Reprint: The Function of Dream Sleep.

Reprint: Persistent Myocardial Ischemia Following Chronic  
Hyperoxia in Conscious Dogs.

DESCRIPTORS: (U) \*Myocardium, \*Ischemia, \*Hyperoxia,  
Blood circulation, Oxygen, Dogs, Reprints

DESCRIPTORS: (U) \*Myocardium, \*Ischemia, \*Hyperoxia,  
Blood circulation, Oxygen, Dogs, Reprints

IDENTIFIERS: (U) Dreams, PE61102F, WUAFOSR2312A1

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1

SUPPLEMENTARY NOTE: Pub. in Nature, v304 n5922 p111-114,  
14 Jul 83.

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 355

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AD-A140 354

8/19

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF  
MATHEMATICS

(U) An Algebraic Approach to Bounded Controllability of  
Linear Systems.

84

9P

PERSONAL AUTHORS: Sontag, E. D. ;

CONTRACT NO. AFOSR-80-0196

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR  
TR-84-0235

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Jnl. of Control,  
v39 n1 p181-188 1984.

Reprint: An Algebraic Approach to Bounded Controllability  
of Linear Systems.

DESCRIPTORS: (U) \*Linear systems, \*Control, \*Algebra,  
Approach, Matrices(Mathematics), Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

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CALIFORNIA UNIV SANTA BARBARA INST OF ENVIRONMENTAL  
STRESS

(U) Effects of Carbon Dioxide Inhalation on Physiological  
Responses to Cold.

DEC 83

8P

PERSONAL AUTHORS: Wagner, J. A. ; Matsushita, K. ; Horvath, S.  
M. ;

CONTRACT NO. AFOSR-78-3534, PHS-RR0-7099-15

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR  
TR-84-0287

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Aviation, Space and  
Environmental Medicine, v54 n12 p1074-1078 Dec 83.

Reprint: Effects of Carbon Dioxide Inhalation on  
Physiological Responses to Cold.

DESCRIPTORS: (U) \*Carbon dioxide, \*Temperature control,  
\*Low temperature, Inhalation, Physiological effects,  
Males, Females, Respiration, Body temperature, Human body,  
Oxygen consumption, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2312A1

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A140 353 5/10

AD-A140 345 20/8

ILLINOIS UNIV AT URBANA DEPT OF PSYCHOLOGY

DALHOUSIE UNIV HALIFAX (NOVA SCOTIA)

(U) Sequential Expectancies and Decision Making in a Changing Environment. An Electrophysiological Approach,

(U) Visual Fields for Frontal Plane Motion and for Changing Size,

82 20P

83 6P

PERSONAL AUTHORS: Johnson, R. , Jr.; Donchin, E. ;

PERSONAL AUTHORS: Regan, D. ; Beverley, K. I. ;

CONTRACT NO. F49620-79-C-0233

CONTRACT NO. AFOSR-78-3711

PROJECT NO. 2313

PROJECT NO. 2313

TASK NO. A4

TASK NO. A5

MONITOR: AFOSR  
TR-84-0278

MONITOR: AFOSR  
TR-84-0271

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Psychophysiology, v19 n2 p183-200 1982.

SUPPLEMENTARY NOTE: Pub. in Vision Research, v23 p873-876 1983.

Reprint: Sequential Expectancies and Decision Making in a Changing Environment. An Electrophysiological Approach.

Reprint: Visual Fields for Frontal Plane Motion and for Changing Size.

DESCRIPTORS: (U) \*Decision making. Psychophysiology. Electrophysiology, Reprints

DESCRIPTORS: (U) \*Vision, \*Threshold effects, Motion, Oscillation, Depth, Reprints, Great Britain

IDENTIFIERS: (U) P 300 amplitude, PEB1102F, WJAFOSR2313A4

IDENTIFIERS: (U) PEB1102F, WJAFOSR2313A5

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AD-A140 345

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A140 173 20/9

AD-A139 921 5/10 8/18

PRINCETON UNIV N J PLASMA PHYSICS LAB

YALE UNIV NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) Energetic Ion Beam-Plasma Interactions.

DESCRIPTIVE NOTE: Final rept. 15 Jun 83-15 Jan 84.

MAR 84 7P

PERSONAL AUTHORS: Kulsrud, R. ;

CONTRACT NO. AFOSR-83-0203

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR  
TR-84-0228

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of Grant AFOSR-81-0108.

ABSTRACT: (U) This final report covers work carried out under a Air Force Office of Scientific Research Grant during the period June 15, 1983 to January 15, 1984. During this concluding period we completed the investigation of the amount of neutralization of the energetic ion beam and carried out preliminary investigations of possible instabilities and of the rate at which the beam might expand under various conditions.

DESCRIPTORS: (U) \*Ion beams, \*Plasmas(Physics), \*Mathematical models, Neutralization, Ionosphere, Ion ion interactions

IDENTIFIERS: (U) WUAFOSR23Q1A7, PEG1102F

AD-A140 173

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(U) Limits of Pattern Discrimination in Human Vision.

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Jan 83-30 Jan 84,

JAN 84 51P

PERSONAL AUTHORS: Hirsch, J. ;

CONTRACT NO. F49620-83-C-0026

PROJECT NO. 2313

TASK NO. A5

MONITOR: AFOSR  
TR-84-0183

## UNCLASSIFIED REPORT

ABSTRACT: (U) The studies reported in Annual Technical Report 1 were designed to probe various aspects of spatial pattern discrimination. Several important findings have emerged allowing limits of pattern discrimination to be related to structural properties of the photoreceptor lattice. First, our findings have suggested that spatial frequency discrimination exceeds resolution of the photoreceptor mosaic for spatial frequencies above approximately 4 c/deg, thus spatial frequency discrimination qualifies as a hyperacuity task. Further, spatial frequency discrimination was not a smooth function of spatial frequency, but rather showed a regularly segmented structure that appeared to be related to foveal photoreceptor center-to-center spacing. This result suggests that the photoreceptor lattice could be the primary geometrical instrument for estimating distance or separations between stimulus features. We have developed a technique to study the structural quality of a retinal mosaic by digitizing the foveal photoreceptor lattice of a primate (Macacca fascicularis). Our analyses of the foveal region has revealed a very high quality hexagonal lattice with a correlation length of at least 130 photoreceptors. These results confirm that the photoreceptor lattice is constructed with sufficient structural quality to provide a source of geometrical information reflected in spatial discrimination tasks.

AD-A139 921

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 921 CONTINUED

AD-A139 912 12/1

DESCRIPTORS: (U) \*Vision, Patterns, Discrimination,  
Humans, Limitations, Photoreceptors, Spatial distribution,  
Frequency, Fovea

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCH

(U) On Mapping Homogeneous Graphs on a Linear Array-  
Processor Model.

IDENTIFIERS: (U) WUAFOSR2313A5, PE81102F

DESCRIPTIVE NOTE: Technical rept.,

OCT 83 46P

PERSONAL AUTHORS: Ramakrishnan, I. V. ; Fussell, D. S. ;  
Silberschatz, A. ;

REPORT NO. CAR-TR-30, CS-TR-1339

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR  
TR-84-0180

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents a formal model of  
linear array processors suitable for VLSI implementation  
as well as graph representation of programs suitable for  
execution on such a model. A distinction is made between  
correct mapping and correct execution of such graphs on  
this model and the structure of correctly mappable graphs  
are examined. The formalism developed is used to  
synthesize algorithms for this model. (Author)

DESCRIPTORS: (U) \*Mathematical models, \*Graphs, \*Mapping,  
\*Linear arrays, Syntax, Semantics, Homogeneity,  
Algorithms, Synthesis

IDENTIFIERS: (U) Homogeneous maps, VSLI (Very Large Scale  
Integration), PE81102F, WUAFOSR2304A7

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AD-A139 912

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 889 12/1 20/8

AD-A139 874 20/8 5/1 14/5

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCHMARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCH

(U) A Parallel Method for Natural Texture Synthesis.

(U) Evidence Accumulation for Spatial Reasoning in Aerial  
Image Understanding.

DESCRIPTIVE NOTE: Technical rept..

DESCRIPTIVE NOTE: Technical rept..

NOV 83 16P

OCT 83 39P

PERSONAL AUTHORS: Ma, S. ;Gagalowicz, A. ;

PERSONAL AUTHORS: Hwang, V. S. S. ;Matsuyama, T. ;Davis, L.  
S. ;Rosenfeld, A. ;

REPORT NO. CAR-TR-32, CS-TR-1343

CONTRACT NO. F49620-83-C-0082

REPORT NO. CAR-TR-28, CS-TR-1338

PROJECT NO. 2304

CONTRACT NO. F49620-83-C-0082

TASK NO. A7

PROJECT NO. 2304

MONITOR: AFOSR

TASK NO. A7

TR-84-0181

MONITOR: AFOSR

TR-84-0178

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper deals with an optimization technique applied to natural texture synthesis. It proposes a definition of a global criterion which is the mean square error between the statistical features of a natural original texture and those of an artificially generated one. A gradient algorithm is used to minimize this criterion. The statistical feature vector used was the autocorrelation function although this is by no means the only choice. The textures generated are very similar to the original ones. This method can be implemented in a highly parallel manner. (Author)

DESCRIPTORS: (U) \*Stochastic processes, \*Image processing, \*Texture, \*Synthesis, Global, Vector analysis, Optimization, Gradients, Iterations, Data compression, Vector analysis, Parameters, Computer graphics, Seismic data, Pictures, Sand, Woolen textiles

IDENTIFIERS: (U) \*Texture synthesis, Parallel algorithm, Rattan, PE61102F, WUAFOSR2304A7

UNCLASSIFIED REPORT

ABSTRACT: (U) This document describes a control structure for building an Image Understanding System. This system can deal with objects with diverse appearances when consistent spatial relations exist between objects. By accumulating consistent predictions originated from existing instances, our system can dynamically reason about what to do in order to construct interpretations of the image. This paper, discusses parts of the proposed system - the representation of spatial knowledge, the accumulation of evidence, the focus of attention mechanism, and the integration of constraints for top-down control. (Author)

DESCRIPTORS: (U) \*Image processing, \*Systems engineering, \*Control systems, \*Aerial photography, Segmented, Accumulation, Extraction, Experimental data, Reasoning, Construction

IDENTIFIERS: (U) IUS(Image Understanding System), Knowledge representation, WUAFOSR2304A7, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 869 20/6 12/1 9/2 AD-A139 869 CONTINUED

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCH

(U) Synthesis of Natural Textures on 3-D Surfaces.

NOV 83 26P

DESCRIPTORS: (U) \*Image processing, \*Mathematical models,  
\*Computer graphics, \*Surface analysis, \*Texture, Three  
dimensional, Curvature, Edges, Templates, Vector analysis,  
Coordinates, Synthesis

IDENTIFIERS: (U) PES1102F, WUAFORS2304A2

PERSONAL AUTHORS: Gagalowicz, A. ; Ma, S. D. ;

REPORT NO. CAR-TR-33, CS-TR-1344

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0176

#### UNCLASSIFIED REPORT

**ABSTRACT:** (U) This paper presents a new method for the synthesis of textures of 3-D surfaces. To the authors' knowledge, one basic technique has been presented up to now in the literature. In this standard method, textures are synthesized by mapping a rectangular template onto the curved surface. This method is complex, requires substantial computing time, and presents some drawbacks such as the possibility of obtaining aliasing effects and continuity problems along the edges of the curved templates. Procedures to eliminate these problems are available but make this synthesis even more unattractive. The method proposed in this paper does not present the former drawbacks. The authors do not use a template mapping, which is a drawback in itself. The synthesis is achieved continuously on the surface, so that there are no edge effects and also no aliasing effects. This method is a simple extension of a procedure that we have proposed before in the literature for planar textures. Any kind of texture can be reproduced with a good similarity to the reference texture used. It also has the important advantage that only one set of second order statistics (a small amount of data) needs to be computed on a planar version of the reference texture to synthesize this texture on any surface and at any distance. Some results on simple surfaces are displayed (cylinder, sphere), but the method holds for any surface and is relatively quick and easy. (Author)

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SEARCH CONTROL NO. 038187

AD-A139 867 12/1

AD-A139 858 12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION  
AND DECISION SYSTEMS

WISCONSIN UNIV-MILWAUKEE

(U) Hierarchical Aggregation of Linear Systems with  
Multiple Time Scales.

(U) An Exact Recursion for the Composite Nearest-Neighbor  
Degeneracy for a 2XN Lattice Space.

NOV 83 16P

FEB 84 7P

PERSONAL AUTHORS: Coderch, M. ; Willisky, A. S. ; Sastry, S. S.  
; Castanon, D. A. ;

PERSONAL AUTHORS: McQuistan, R. B. ; Hock, J. L. ;

CONTRACT NO. AFOSR-82-0258

CONTRACT NO. AFOSR-81-0192

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A1

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0187

TR-84-0188

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on  
Automatic Control, VAC-28 n11 p1017-1030 Nov 83.  
Supersedes AD-A125 669.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mathematical Physics,  
v25 n2 p261-265 Feb 84.

Reprint: Hierarchical Aggregation of Linear Systems with  
Multiple Time Scales.

Reprint: An Exact Recursion for the Composite Nearest-  
Neighbor Degeneracy for a 2XN Lattice Space.

DESCRIPTORS: (U) \*Linear systems, \*Perturbations, Time  
intervals, Asymptotic normality,  
Approximation(Mathematics), Operators(Mathematics),  
Reprints

DESCRIPTORS: (U) \*Recursive functions, \*Particles,  
Polynomials, Equations, Decomposition, Reprints

IDENTIFIERS: (U) Time scales, WUAFOSR2304A1, PE81102F

IDENTIFIERS: (U) Lattice space, PE81102F, WUAFOSR2304A5

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 852 12/1

AD-A139 847 12/1 9/2

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCHMARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCH

(U) Modular Matrix Multiplication on a Linear Array.

(U) Embedding of Networks of Processors into Hypercubes.

DESCRIPTIVE NOTE: Technical rept.,

DESCRIPTIVE NOTE: Technical rept.,

NOV 83 25P

DEC 83 24P

PERSONAL AUTHORS: Ramakrishnan, I. V. ; Varman, P. J. ;

PERSONAL AUTHORS: Wu, A. Y. ;

REPORT NO. CAR-TR-31, CS-TR-1340

REPORT NO. CAR-TR-36, CS-TR-1354

CONTRACT NO. F49620-83-C-0082

CONTRACT NO. F49620-83-C-0082

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A7

TASK NO. A2

MONITOR: AFOSR  
TR-84-0179MONITOR: AFOSR  
TR-84-0175

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rice Univ., Houston, TX. Dept. of Electrical Engineering.

A3STRACT: (U) In the study of parallel computing, networks of processors are often organized into various configurations such as trees, pyramids, and mesh arrays. These configurations can be represented as graphs. Using the properties and structures of the underlying graph effectively, the computation and communication speeds can often be improved. The hypercube is a good host graph for the embedding of networks of processors because of its low degree and low diameter. Graphs such as trees and arrays can be embedded into a hypercube with small dilation and expansion costs, but there are classes of graphs which can be embedded into a hypercube only with large expansion cost or large dilation cost.

DESCRIPTORS: (U) \*Algorithms, \*Linear arrays, \*Matrices(Mathematics), \*Multiplication, Input output processing, Bandwidth, Storage, Cells

DESCRIPTORS: (U) \*Graphs, \*Embedding, \*Parallel processors, \*Networks, Configurations, Binary arithmetic, Computations, Hamiltonian functions, Trees, Nodes

IDENTIFIERS: (U) VLSI(Very Large Scale Integration),  
PE61102F. WUAFOSR2304A7

IDENTIFIERS: (U) \*Hypercubes, PE61102F, WUAFOSR2304A2

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AD-A139 847

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## DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 831 7/4 12/1

AD-A139 829 7/4 20/8

STANFORD UNIV CA DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Comments on Two Treatments of Symmetry Rules in Chemical Reactions.

(U) Comments on Pattern Formation in Precipitation Processes.

SEP 83 5P

AUG 82 7P

PERSONAL AUTHORS: Metiu, H. ; Schatz, G. C. ; Ross, J. ;

PERSONAL AUTHORS: Venzl, G. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. B1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0209

TR-84-0189

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v79 n6 p2854-2856, 15 Sep 83.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v77 n3 p1308-1313, 1 Aug 82.

Reprint: Comments on Two Treatments of Symmetry Rules in Chemical Reactions.

Reprint: Comments on Pattern Formation in Precipitation Processes.

DESCRIPTORS: (U) \*Chemical reactions, \*Symmetry, \*Mathematical analysis, Adiabatic conditions, Electronic states, Approach, Barriers, Height, Electron transitions, Amplitude, Reaction kinetics, Probability, Transitions, Reprints

DESCRIPTORS: (U) \*Ions, \*Diffusion, \*Precipitation, Patterns, Rings, Spatial distribution, Stability, Nucleation, Theory, Reaction kinetics, Growth(General), Particles, Colloids, Lead, Iodides, Salts, Precipitates, Solutions(General), Mathematical analysis, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

IDENTIFIERS: (U) L1esegang rings, PE81102F, WUAFOSR2303B1

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## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 826 6/4 9/2 1/3  
ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) An Expert Distributed Robotics System with  
Comprehension and Learning Abilities in the Aircraft  
Flight Domain.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 83,

FEB 84 43P

PERSONAL AUTHORS: Waltz, D. L. ; DeJong, G. F. ;

REPORT NO. T-138

CONTRACT NO. F49620-82-K-0009

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR  
TR-84-0185

## UNCLASSIFIED REPORT

ABSTRACT: (U) Research has continued during the past year on critical components for a comprehensive expert system for on-board use in an aircraft. The investigators report on a system that can reason about the operation of a gas turbine engine; a system about route and trajectory meta-planning; a temporal reasoning system; a system for extracting speaker goals from natural language dialogue; systems for acquiring new knowledge schemas from natural language input; and systems for high level perceptual reasoning.

DESCRIPTORS: (U) \*Robotics, \*Artificial intelligence, \*Automation, \*Computer aided diagnosis, Aircraft, Flight, Systems engineering, Distributed data processing, Information systems, Natural language, Learning, Comprehension, Semantics, Data processing, Onboard

IDENTIFIERS: (U) \*Expert systems, PE61102F,  
WUAFOSR2304A7

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AD-A139 797 5/10

BERNARD M BARUCH COLL NEW YORK

(U) Brain Responses and Information Processing IV.  
Investigations of Hemispheric Asymmetry in Event  
Related Potentials and Performance during  
Discrimination of Line Orientation, Color, Shape and  
under Visual Masking.

DESCRIPTIVE NOTE: Annual rept. no. 4 (Final), 1 Oct 79-30  
Sep 83,

NOV 83 84P

PERSONAL AUTHORS: Andreassi, J. L. ; Juszcak, N. M. ;

CONTRACT NO. F49620-80-C-0013

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR  
TR-84-0182

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A125 681.

ABSTRACT: (U) The research completed over the last twelve months has included a number of studies concerned with evoked cortical potential correlates of visual stimulus processing in humans. The first experiment was conducted in order to replicate an earlier finding in which the amplitude of a relatively late positive component of the event related potential (ERP), known as the P3, was larger to a line orientation that required a 'yes' response than one that required a 'no'. The angular difference between the two lines was only 5 degrees. Another purpose was to assess the reliability of the better right hemisphere performance found with male subjects in the line orientation discrimination task used. In a second experiment, we examined the possibility of hemispheric asymmetry in response to two different colors (red and blue). The two hemispheres responded in essentially the same manner to the two colors. However, an interesting finding was the larger ERPs of both left and right hemispheres to the color blue, especially with central visual field stimulation. A third experiment was directed at the determination of whether the right

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 797 CONTINUED

AD-A139 794 7/3 11/1

hemisphere would be more sensitive to visual masking than the left, especially with a metacontrast paradigm which is dependent on spatial factors to produce the masking effect. A fourth experiment was performed to determine the relative responsivity of the two hemispheres to verbal (letter) and spatial (geometric form) stimuli.

DESCRIPTORS: (U) \*Brain, \*Information processing, \*Psychophysiology, Response(Biology), Visual perception, Humans, Stimuli, Males, Females, Discrimination, Orientation(Direction), Scoring, Vision, Masking, Sensitivity

IDENTIFIERS: (U) PE61102F, WUAFOSR2313A4

ARIZONA UNIV TUCSON DEPT OF CHEMISTRY

(U) Improved Acetone-Adduct and Acetylene-Terminated Quinoxaline Oligomers.

DESCRIPTIVE NOTE: Interim rept.,

DEC 83 11P

PERSONAL AUTHORS: Lin, S.; Marvel, C. S. ;

CONTRACT NO. AFOSR-82-0007

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0221

UNCLASSIFIED REPORT

ABSTRACT: (U) A series of acetone-adducts of acetylene-terminated quinoxaline oligomers and polymers was synthesized using 3-(4-ethynylphenoxy) benzil as endcapping agent for possible adhesives for airplane manufacturing.

DESCRIPTORS: (U) \*Polymers, \*Quinoxalines, \*Adhesives, Acetones, Chemical analogs, Acetylenes, Synthesis(Chemistry), Ethyl radicals, Phenyl radicals, Benzoin, Aircraft, Manufacturing, Bromine compounds, Ethers

IDENTIFIERS: (U) Benzil/3-(4-ethynylphenoxy), PE61102F, WUAFOSR2303B2

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## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 789 7/5 20/5

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Light Induced Bistability in S206F2 Reversible Yield  
2S03F: Theory and Experiment.

JAN 84 11P

PERSONAL AUTHORS: Zimmermann, E. C. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0212

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemistry and Physics,  
v80 n2 p720-729, 15 Jan 84.Reprint: Light Induced Bistability in S206F2 Reversible  
Yield 2S03F: Theory and Experiment.DESCRIPTORS: (U) \*Chemical reactions, \*Sulfur compounds,  
\*Fluorides, \*Laser induced fluorescence, \*Stability,  
Chemical equilibrium, Laser beams, Illumination, Vapor  
phases, Free radicals, Dynamics, Equations, Hysteresis,  
Absorption, Measurement, Irradiation, Homogeneity,  
Thermochemistry, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303B1

AD-A139 789

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AD-A139 788 20/8 20/10

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Nonlocal Potentials in Penning and Associative  
Ionization.

FEB 84 13P

PERSONAL AUTHORS: Lam, K. S. ; George, T. F. ;

CONTRACT NO. AFOSR-82-0046

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR  
TR-84-0213

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v29 n2  
p492-502 Feb 84.Reprint: Nonlocal Potentials in Penning and Associative  
Ionization.DESCRIPTORS: (U) \*Ionization, \*Ionization potentials,  
\*Molecular association, Collisions, Molecule molecule  
interactions, Energy, Quantum theory, Dynamics,  
Mathematical analysis, Electron transitions, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303A2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 787 20/13

AD-A139 781 20/8 12/1

STANFORD UNIV CA DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Thermodynamic Processes, Time Scales, and Entropy Production.

(U) Dynamic Fluctuations in Optical Bistability.

82 5P

81 15P

PERSONAL AUTHORS: Fairén, V. ; Hatlee, M. D. ; Ross, J. ;

PERSONAL AUTHORS: DelleDonne, M. ; Richter, P. H. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. B1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0203

TR-84-0197

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v88 p70-73 1982.

SUPPLEMENTARY NOTE: Pub. in Zeitschrift fuer Physik B, Condensed Matter, v42 p271-283 1981.

Reprint: Thermodynamic Processes, Time Scales, and Entropy Production.

Reprint: Dynamic Fluctuations in Optical Bistability.

DESCRIPTORS: (U) \*Thermodynamics, Time dependence, Entropy, Heat transfer, Relaxation time, Reversible, Irreversible processes, Ratios, Thermal conductivity, Reprints

DESCRIPTORS: (U) \*Optical properties, \*Stability, \*Computations, Correlation techniques, Numerical integration, Scale, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2303B1

IDENTIFIERS: (U) Optical bistability, Time correlation functions, PE81102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 780 7/4

AD-A139 775 12/1 9/3

STANFORD UNIV CA DEPT OF CHEMISTRY

MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA  
DEPT OF ELECTRICAL ENGINEERING AND SCIENCE

(U) Measurements of Temporal and Spatial Sequences of  
Events in Periodic Precipitation Processes.

FEB 82 16P

JUL 83 7P

PERSONAL AUTHORS: Kai, S. ; Mueller, S. C. ; Ross, J. ;

PERSONAL AUTHORS: Moustakides, G. ; Kassam, S. A. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-82-0022

PROJECT NO. 2303

PROJECT NO. 2304

TASK NO. 81

TASK NO. A5

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0194

TR-84-0192

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemistry and Physics,  
v76 n3 p1392-1406, 1 Feb 82.

SUPPLEMENTARY NOTE: Pub. in IEEE Trans. Information  
Theory, vIT-29 n4 p814-819 Jul 83.

Reprint: Measurements of Temporal and Spatial Sequences  
of Events in Periodic Precipitation Processes.

Reprint: Robust Wiener Filters for Random Signals in  
Correlated Noise.

DESCRIPTORS: (U) \*Electrolytes \*Precipitation, Rings.  
Ammonium compounds, Hydroxides, Magnesium sulfates,  
Precipitates, Gels, Lead compounds, Iodides, Light  
transmission, Light scattering, Deflection, Gravity,  
Diffusion, Nucleation, Colloids, Particles,  
Growth(General), Turbidity, Refractive index, Reprints

DESCRIPTORS: (U) \*Mathematical filters, \*Signal to noise  
ratio, \*Minimax technique, Matrices(Mathematics),  
Correlation, Noise, Reprints

IDENTIFIERS: (U) Liesegang rings, PE61102F,  
WUAFOSR230381

IDENTIFIERS: (U) Wiener filters, Robust procedures,  
PE61102F, WUAFOSR2304A5

AD-A139 780

AD-A139 775

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A139 758 20/2 20/12

AD-A139 754 12/1 9/3

ROCKWELL INTERNATIONAL THOUSAND OAKS CA  
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

CALIFORNIA UNIV LOS ANGELES DEPT OF SYSTEM SCIENCE

(U) Undoped Buffer Layer Development.

(U) On Abstract Stochastic Bilinear Equations with White Noise Inputs.

DESCRIPTIVE NOTE: Final technical rept. 1 Mar 81-31 Mar 83,

83 17P

JAN 84 59P

PERSONAL AUTHORS: Balakrishnan, A. V. ;

PERSONAL AUTHORS: Miller, D. ;

CONTRACT NO. AFOSR-83-0318

REPORT NO. MRDC41086.3FTR

PROJECT NO. 2304

CONTRACT NO. F49620-81-C-0038

TASK NO. A1

PROJECT NO. 2306

MONITOR: AFOSR

TASK NO. B1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0231

TR-84-0189

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) This program focused on the growth and analysis of epitaxial layers using three different techniques which have been successful in producing high purity, high mobility, epilayer material for device applications. These included molecular beam epitaxy (MBE), metalorganic chemical vapor deposition (MOCVD), and vapor phase epitaxy. Application of characterization techniques such as SIMS (Secondary Ion Mass Spectrometry), infrared absorption, photoluminescence, deep level transient spectroscopy, and photoconductivity has allowed progress to be made in understanding the major deep impurity centers in semi-insulating epitaxial GaAs. (Author)

DESCRIPTORS: (U) \*Epitaxial growth, \*Buffers, \*Layers, \*Semiconductors, Crystals, Molecular beams, Vapor deposition, Vapor phases, Purity, Mobility, Mass spectroscopy, Infrared spectroscopy, Photoluminescence, Photoconductivity, Impurities, Insulation, Gallium arsenides, Hall effect, Traps, Measurement

IDENTIFIERS: (U) MBF (Molecular Beam Epitaxy), PE81102F, WUAFOSR2306B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 753 12/1

AD-A139 737 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND STATISTICS

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND STATISTICS

(U) Stability for a Class Stochastic Nonlinear Feedback Systems.

(U) Some Bayesian Lower Bounds on Reliability in the Lognormal Distribution.

84 16P

83 13P

PERSONAL AUTHORS: Rao, A. N. V. ; Padgett, W. J. ;

PERSONAL AUTHORS: Padgett, W. J. ; Johnson, M. P. ;

CONTRACT NO. AFOSR-81-0166

CONTRACT NO. AFOSR-81-0166

PROJECT NO. 2304

PROJECT NO. 2304

TASK NO. A5

TASK NO. A5

MONITOR: AFOSR TR-84-0188

MONITOR: AFOSR TR-84-0191

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Integral Equations, n6 p159-173 1984.

SUPPLEMENTARY NOTE: Pub. in Canadian Jnl. of Statistics, v11 n2 p137-147 1983. Summary in French.

Reprint: Stability for a Class Stochastic Nonlinear Feedback Systems.

Reprint: Some Bayesian Lower Bounds on Reliability in the Lognormal Distribution.

DESCRIPTORS: (U) \*Nonlinear systems, \*Feedback, \*Stochastic processes, Stability, Banach space, Equations, Operators(Mathematics), Reprints

DESCRIPTORS: (U) \*Mathematical models, \*Distribution functions, Life tests, Bayes theorem, Reliability, Monte Carlo method, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

IDENTIFIERS: (U) Lognormal distribution, Lower bounds, PE61102F, WUAFOSR2304A5

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 735

11/7

20/3

9/1

AD-A139 731

7/4

TEXAS TECH UNIV LUBBOCK

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Surface Studies of Dielectric Materials Used in Spark Gaps.

(U) Mesoscopic Structure of Pattern Formation in Initially Uniform Colloids.

JAN 84 8P

82 8P

PERSONAL AUTHORS: Jackson, G. ; Hatfield, L. ; Kristiansen, M. ; Hagler, M. ; Marx, J. ;

PERSONAL AUTHORS: Mueller, S. C. ; Kal, S. ; Ross, J. ;

CONTRACT NO. F49620-79-C-0191

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2301

PROJECT NO. 2303

TASK NO. A7

TASK NO. B1

MONITOR: AFOSR  
TR-84-0193

MONITOR: AFOSR  
TR-84-0205

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v55 n1 p262-268, 1 Jan 84.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v86 n22 p4294-4297 1982.

Reprint: Surface Studies of Dielectric Materials Used in Spark Gaps.

Reprint: Mesoscopic Structure of Pattern Formation in Initially Uniform Colloids.

DESCRIPTORS: (U) \*Insulation, \*Dielectric properties, \*Spark gaps, \*Electrodes, Switches, Surface analysis, Coatings, Thickness, Graphite, Voltage, Statistical data, Reprints

DESCRIPTORS: (U) \*Colloids, \*Lead compounds, \*Iodides, \*Patterns, Rings, Homogeneity, Agar, Gels, Particles, Crystal structure, Length, Scale, Radius(Measure), Particle size, Distribution, Range(Distance), Coupling(Interaction), Growth(General), Diffusion, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2301A7

IDENTIFIERS: (U) Llesegang rings, PE61102F, WUAFOSR2303B1

AD-A139 735

AD-A139 731

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 730 7/4

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Nucleation and Colloidal Growth in Concentration Gradients (Liesegang Rings).

AUG 82 8P

PERSONAL AUTHORS: Venzl,G. ;Ross,J. ;

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0204

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v77  
n3 p1302-1307, 1 Aug 82.

Reprint: Nucleation and Colloidal Growth in Concentration Gradients (Liesegang Rings).

DESCRIPTORS: (U) \*Colloids, \*Electrolytes, \*Diffusion, \*Nucleation, Precipitation, Growth(General), Concentration(Chemistry), Gradients, Rings, Reactants(Chemistry), Equations, Length, Time, Scale, Mathematical analysis, Salts, Solutions(General), Ions, Reprints

IDENTIFIERS: (U) Liesegang rings, PE81102F, WUAFOSR2303B1

AD-A139 729 7/4 7/2

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Voltammetric Determination of Water in an Aluminum Chloride-N-n-Butylpyridinium Chloride Ionic Liquid,

OCT 83 5P

PERSONAL AUTHORS: Saham1,S. ;Osteryoung,R. A. ;

CONTRACT NO. AFOSR-81-0007

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR  
TR-84-0215

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v55 n12  
p1970-1973 Oct 83.

Reprint: Voltammetric Determination of Water in an Aluminum Chloride-N-n-Butylpyridinium Chloride Ionic Liquid.

DESCRIPTORS: (U) \*Water, \*Electrochemistry, \*Fused salts, \*Voltammetry, Aluminum compounds, Chlorides, Butyl radicals, Pyridines, Melts, Chemical reactions, Hydrochloric acid, Platinum, Electrodes, Disks, Calibration, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 714 7/3 20/2 20/12 7/1

AD-A139 714 7/3 20/2 20/12 7/1

CINCINNATI UNIV OH DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) A Theoretical Investigation of Chain Packing and Electronic Band Structure of the Rigid-Rod Polymer Trans-Poly(p-Phenylene Benzobisthiazole) in the Crystalline State.

83 9P

MAY 83 5P

PERSONAL AUTHORS: Bhaumik, D. ; Mark, J. E. ;

PERSONAL AUTHORS: Escher, C. ; Ross, J. ;

PERSONAL AUTHORS: Bhaumik, D. ; Mark, J. E. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-83-0027

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. A3

MONITOR: AFOSR  
TR-84-0208

MONITOR: AFOSR

TR-84-0218

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Polymer Science: Polymer Physics Edition, v21 p2543-2548 1983.

SUPPLEMENTARY NOTE: Pub. in Proceedings of the National Academy Science, v80 p3133-3135 May 83.

Reprint: A Theoretical Investigation of Chain Packing and Electronic Band Structure of the Rigid-Rod Polymer Trans-Poly(p-Phenylene Benzobisthiazole) in the Crystalline State.

Reprint: Critique of a Proposed Stability Criterion for Chemical Systems Far from Equilibrium.

DESCRIPTORS: (U) \*Polymers, \*Crystal structure, \*Electrons, \*Energy bands, Chains, Thiazoles, Electronic states, Cells, Energy, Atomic orbitals, Crystal lattices, Electrical conductivity, Reprints

DESCRIPTORS: (U) \*Equations, \*Chemical reactors, \*Stability, Thermodynamics, Steady state, Free energy, Reprints

IDENTIFIERS: (U) Thiazole/Poly(p-phenylene Benzobis), PEG1102F, WUAFOSR2303A3

IDENTIFIERS: (U) \*Flow reactors, PEG1102F, WUAFOSR2303B1

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 702 11/6 11/8 7/4 AD-A139 701 20/14 17/9  
 RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF MECHANICAL  
 ENGINEERING HAYSTACK OBSERVATORY WESTFORD MA

(U) Topological Reaction Rate Measurements Related to  
 Scuffing. (U) The Fossil Theory of Nighttime High Latitude F Region  
 Troughs,

OCT 83 17P

DESCRIPTIVE NOTE: Technical paper.

PERSONAL AUTHORS: Evans, J. V. ; Holt, J. M. ; Oliver, W. L. ;  
 Ward, R. H. ;

OCT 83 8P

PERSONAL AUTHORS: Lauer, J. L. ; Fung, S. S. ; Jones, W. R. ,  
 Jr. ;

PROJECT NO. 2310

CONTRACT NO. AFOSR-81-0005, NSG-3180-12-81

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR  
TR-84-0228

TASK NO. A2

UNCLASSIFIED REPORT

MONITOR: AFOSR  
TR-84-0224

Availability: Document partially illegible.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Geophysical Research,  
 V88 NA10 p7769-7782, 1 Oct 83.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ASLE/ASME Lubrication  
 Conference, 6p 18-20 Oct 83.

Reprint: The Fossil Theory of Nighttime High Latitude F  
 Region Troughs.

Reprint: Topological Reaction Rate Measurements Related  
 to Scuffing.

DESCRIPTORS: (U) \*Steel, \*Surface properties,  
 \*Lubrication, \*Scoring, Topology, Reaction kinetics,  
 Measurement, Surfaces, Profiles, Lubricants, Sliding  
 contacts, Hydroelasticity, Lubricant additives,  
 Exposure (General), Alcohols, Hydrochloric acid, Phase,  
 Reactivity, Microscopes, Phase locked systems, Surface  
 chemistry, Interferometry, Heat treatment, Reprints

IDENTIFIERS: (U) Triheptanoate/trimethylolpropane,  
 Tricresylphosphate, Scuffing, PE61102F, WUAFOSR2303A2

IDENTIFIERS: (U) Fossil theory, PE61102, WUAFOSR2310A2

DESCRIPTORS: (U) \*F region, \*Ionospheric propagation,  
 Incoherent scattering, Radar signals, High latitudes,  
 Electron density, Ion density, Reprints



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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 698

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AD-A139 698

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FORD MOTOR CO DEARBORN MICH

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) HPLC Determination of Hydroperoxidic Products Formed in the Autooxidation of n-Hexadecane at Elevated Temperatures.

(U) CNDO/2 Molecular Orbital Calculations on the Antifolate DAMP and Some of Its Analogues: Conformational Characteristics.

SEP 83 5P

83

7P

PERSONAL AUTHORS: Jensen, R. K. ; Zinbo, M. ; Korcek, S. ;

PERSONAL AUTHORS: Welsh, W. J. ; Mark, J. E. ; Cody, V. ; Zakrzewski, S. F. ;

CONTRACT NO. F49620-80-C-0061

CONTRACT NO. AFOSR-78-3883

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A2

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0223

TR-84-0220

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chromatographic Science, v21 p394-397 Sep 83

Reprint: CNDO/2 Molecular Orbital Calculations on the Antifolate DAMP and Some of Its Analogues: Conformational Characteristics.

Reprint: HPLC Determination of Hydroperoxidic Products Formed in the Autooxidation of n-Hexadecane at Elevated Temperatures.

DESCRIPTORS: (U) \*Liquid chromatography, \*Hydrogen peroxide, \*Oxidation, \*Decanes, High temperature, Ultraviolet detectors, Quantitative analysis, Isomers, Ketones, Alcohols, Reprints

DESCRIPTORS: (U) \*Molecular orbitals, \*Enzyme inhibitors, Pyrimidines, Molecular structure, Length, Angles, Oxidoreductases, Quantitative analysis, Quantum theory, Reprints

IDENTIFIERS: (U) Hexadecane, PE61102F, WUAFOSR2303A2

IDENTIFIERS: (U) CNDO(Complete Neglect of Differential Overlap), Diaminopyrimidines, DHFR(Dihydrofolate reductase), PE61102F, WUAFOSR2303A3

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 695 7/4 7/3 12/1

AD-A139 694 7/4 12/1

STANFORD UNIV CA DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) The Periodically Forced Conversion of 2,3-Epoxy-1-Propanol to Glycerine: A Theoretical Analysis,

(U) Periodic Precipitation Patterns in the Presence of Concentration Gradients. 2. Spatial Bifurcation of Precipitation Bands and Stochastic Pattern Formation,

JUN 83 13P

83 10P

PERSONAL AUTHORS: Rehms, P. ; Zimmermann, E. C. ; Ross, J. ; Frisch, H. L. ;

PERSONAL AUTHORS: Kaf, S. ; Mueller, S. C. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. B1

MONITOR: AFOSR  
TR-84-0207

MONITOR: AFOSR  
TR-84-0206

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v78 n12 p7241-7251, 15 Jun 83.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v87 p806-813 1983. See also AD-A139 692.

Reprint: The Periodically Forced Conversion of 2,3-Epoxy-1-Propanol to Glycerine: A Theoretical Analysis.

Reprint: Periodic Precipitation Patterns in the Presence of Concentration Gradients. 2. Spatial Bifurcation of Precipitation Bands and Stochastic Pattern Formation.

DESCRIPTORS: (U) \*Reaction kinetics, \*Hydration, \*Epoxy compounds, \*Propanols, \*Glycerols, Numerical analysis, Test reactors, Oscillation, Perturbations, External, Entrainment, Band spectra, Phase locked systems, Resonance, Amplitude, Temperature, Concentration(Chemistry), Dissipation, Bifurcation(Mathematics), Reprints

DESCRIPTORS: (U) \*Chemical precipitation, \*Stochastic processes, Lead compounds, Iodides, Electrolytes, Colloids, Gradients, Rings, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B1

IDENTIFIERS: (U) Liesegang rings, Lead iodide, PE61102F, WUAFOSR2303B1

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OTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A139 693

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CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) Band Structures, Geometry, and Partial Oxidation in Iridium Carbonyl Chloride Chains.

83

11P

PERSONAL AUTHORS: Bhaumik, D. ; Mark, J. E. ;

CONTRACT NO. AFOSR-83-0027

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR  
TR-84-0219

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Synthetic Metals, v6 p298-307 1983.

Reprint: Band Structures, Geometry, and Partial Oxidation in Iridium Carbonyl Chloride Chains.

DESCRIPTORS: (U) \*Molecular structure, \*Band spectra  
\*Oxidation, \*Iridium compounds, \*Carbonyl compounds,  
\*Chlorides, Electrical conductivity, Salts, Stoichiometry,  
Chemical equilibrium, Activation energy, Crystal  
structure, Electronic states, Mathematical analysis,  
Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A3

AD-A139 693

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AD-A139 692

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AD-A139 692

7/4

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Periodic Precipitation Patterns in the Presence of Concentration Gradients. 1. Dependence on Ion Product and Concentration Difference.

82

11P

PERSONAL AUTHORS: Mueller, S. C. ; Kai, S. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0200

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v86 p4078-4087 1982. See also AD-A139 694.

Reprint: Periodic Precipitation Patterns in the Presence of Concentration Gradients. 1. Dependence on Ion Product and Concentration Difference.

DESCRIPTORS: (U) \*Electrolytes, \*Precipitation,  
\*Diffusion, Rings, Patterns, Concentration(Chemistry),  
Gradients, Reactants(Chemistry), Lead compounds, Nitrates,  
Potassium compounds, Iodides, Gels, Numbers,  
Position(Location), Band spectra, Width, Colloids,  
Precipitates, Ions, Nucleation, Reprints

IDENTIFIERS: (U) Liesegang rings, Liesegang bands,  
PE61102F, WUAFOSR2303B1

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 691 12/1

AD-A139 682 20/4 12/1 7/1

ILLINOIS UNIV AT CHICAGO CIRCLE DEPT OF MATHEMATICS

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) BIB(8,56,21,3,6) and BIB(10,30,9,3,2) Designs with Repeated Blocks,

(U) Multiple Ranges of Flow Rate with Bistability and Limit Cycles for Schlogl's Mechanism in a CSTR (Continuous Flow Stirred Tank Reactor),

JAN 84 21P

OCT 83 6P

PERSONAL AUTHORS: Hedayat A.; Hwang, H. L.;

PERSONAL AUTHORS: Escher, C.; Ross, J.;

CONTRACT NO. AFOSR-80-0170

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2304

PROJECT NO. 2302

TASK NO. A5

TASK NO. B1

MONITOR: AFOSR

TR-84-0190

MONITOR: AFOSR

TR-84-0210

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Combinatorial Theory, Series A, v36 n1 p73-91 Jan 84.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v78 n8 p3773-3777, 15 Oct 83.

Reprint: BIB(8,56,21,3,6) and BIB(10,30,9,3,2) Designs with Repeated Blocks.

Reprint: Multiple Ranges of Flow Rate with Bistability and Limit Cycles for Schlogl's Mechanism in a CSTR (Continuous Flow Stirred Tank Reactor).

DESCRIPTORS: (U) \*Combinatorial analysis, \*Experimental design, Optimization, Sampling, Reprints

DESCRIPTORS: (U) \*Flow rate, \*Chemical reactors, \*Computations, Equations, Thermodynamics, Steady state, Stationary, Nonlinear analysis, Stability, Reprints

IDENTIFIERS: (U) BIB(Balanced Incomplete Block Design), Block Design, WUAFOSR2304A5, PE61102F

IDENTIFIERS: (U) CSTR(Continuous Flow Stirred Tank Reactor), WUAFOSR2303B1, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A139 681 12/1

AD-A139 678 9/5 20/12 9/1

STANFORD UNIV CA DEPT OF CHEMISTRY

ROCKWELL INTERNATIONAL THOUSAND OAKS CA  
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

(U) On the Path Integral Solution of the Fokker-Planck  
Equation for a System for Non-Conservative Forces,

AUG 81 4P

(U) LSI/VLSI (Large Scale Integration/Very Large Scale  
Integration) Ion Implanted GaAs (Gallium Arsenide) IC  
Processing. Appendix B. Two-Dimensional Modeling of  
GaAs MESFET Devices for Integrated High-Speed Logic  
Circuits.

PERSONAL AUTHORS: Wiegand, F. W. ;

CONTRACT NO. AFOSR-81-0125

DESCRIPTIVE NOTE: Final rept. 25 Jul 80-30 Sep 82,

PROJECT NO. 2303

JAN 84 130P

TASK NO. B1

PERSONAL AUTHORS: Zucca, R. R. ; Kirkpatrick, C. ; Asbeck, P.  
M. ; Eisen, F. H. ; Lee, C. P. ;

MONITOR: AFOSR

TR-84-0198

REPORT NO. MRDC41070.25FR-APP-B

UNCLASSIFIED REPORT

CONTRACT NO. F49620-80-C-0101, ARPA Order-3384

SUPPLEMENTARY NOTE: Pub. in Physics Letters, v84A n9 p465-  
467, 31 Aug 81.

MONITOR: AFOSR

TR-84-0230-APP-B

Reprint: On the Path Integral Solution of the Fokker-  
Planck Equation for a System for Non-Conservative Forces.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendix B to AD-A139 678.

DESCRIPTORS: (U) \*Fokker Planck equations,  
\*Solutions(General), Mathematical models, Greens function,  
Stochastic processes, Paths, Trajectories, Reprints

ABSTRACT: (U) This report summarizes the research  
carried out at North Carolina State University in support  
of the Rockwell International Program on 'LSI-VLSI Ion  
Implanted Planar GaAs IC Processing. The major thrust of  
the program at NCSU was to develop accurate computer  
models for analyzing the performance of short-channel  
GaAs MESFET devices as used in the Rockwell VLSI circuits.  
The modeling research is divided into three parts: (1)  
Two-dimensional finite difference simulation, (2) Two-  
dimensional Monte Carlo analysis, and (3) Analytical  
modeling. The intent was to use the two-dimensional  
analyses to give exact solutions to the device operation  
and to serve as a guide for developing a simpler, and  
less expensive, analytical model of sufficient accuracy  
to be valuable as a design aid and to study effects of  
parameter changes.

IDENTIFIERS: (U) WUAFOSR2303B1, PE61102F

DESCRIPTORS: (U) \*Integrated circuits, \*Gallium  
arsenides, \*Ion implantation, \*Field effect transistors,  
\*Silicon nitrides, \*Metals, \*Semiconductors, Mathematical  
models, Two dimensional, Monte Carlo method, Processing  
equipment, Communication equipment, Ionizing radiation,

AD-A139 681

AD-A139 678

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A139 678 CONTINUED

Spread spectrum, Single crystals, Digital systems, Logic circuits, Ion beams, Substrates, Feasibility studies, Sputtering, Linear systems, Gates(Circuits), Metallizing, Reactivities, Dislocations, Masks, Deposition

IDENTIFIERS: (U) LSI(Large Scale Integration), VLSI(Very Large Scale Integration), Drains, Horizontal Bridgeman Method, Programming(Mask), Implanted channels, Speed(High), Arrays(Logic), Scalars, Drains

AD-A139 677 9/5 20/12 9/1

ROCKWELL INTERNATIONAL THOUSAND OAKS CA  
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

(U) LSI/VLSI (Large Scale Integration/Very Large Scale Integration) Ion Implanted GaAs (Gallium Arsenide) IC Processing. Appendix A. Feasibility Analysis of Gallium-Arsenide Mask Programmable Functions and Logic Arrays for High Performance Communications Systems.

DESCRIPTIVE NOTE: Final rept. 25 Jul 80-30 Sep 82,

JAN 84 86P

PERSONAL AUTHORS: Zucca, R. R. ; Kirkpatrick, C. ; Asbeck, P. M. ; Eisen, F. H. ; Lee, C. P. ;

REPORT NO. MRDC41070.25FR-APP-A

CONTRACT NO. F49620-80-C-0101, ARPA Order-3384

MONITOR: AFOSR  
TR-84-0230-APP-A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendix A to AD-A139 676. See also Appendix B, AD-A139 678.

ABSTRACT: (U) Circuits critical to the performance of advanced radio, radar and spread spectrum communications systems require advances in the state-of-the-art in semiconductor technology to meet the demands of advanced systems. As these systems increase in complexity, extensive digital circuitry is required in addition to the typical linear signal processing circuits. The power, size and weight of advanced systems also becomes unacceptable without continuous advances in semiconductor technology. Moreover an increasing trend is seen in the use of metal mask selectable functions, programmable logic arrays and gate arrays to implement system specific circuitry in an attempt to lower non-recurring costs, minimize risk and shorten development times. GaAs and other technologies with very high speed power-performance figures-of-merit are critical ingredients in systems implementations which satisfy these needs. To meet these advanced system requirements this project was initiated as a multi-phase/year program to develop a group of mask programmable gallium arsenide (GaAs) circuit elements applicable to high speed/performance communications

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AD-A139 677

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AD-A139 678 9/5 20/12 9/1

systems.

ROCKWELL INTERNATIONAL THOUSAND OAKS CA  
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER

DESCRIPTORS: (U) \*Integrated circuits, \*Gallium arsenides, \*Ion implantation, \*Field effect transistors, \*Silicon nitrides, Communication equipment, Processing equipment, Logic circuits, Single crystals, Ion beams, Monte Carlo method, Digital systems, Ionizing radiation, Spread spectrum, Linear systems, Substrates, Semiconductors, Gates(Circuits), Masks, Metallizing, Sputtering, Deposition, Dislocations, Reactivities, Feasibility studies, Radar, Reactivities, Deposition

(U) LSI/VLSI (Large Scale Integration/Very Large Scale Integration) Ion Implanted GaAs (Gallium Arsenide) IC Processing.

DESCRIPTIVE NOTE: Final rept. 25 Jul 80-30 Sep 82.

JAN 84 147P

PERSONAL AUTHORS: Zucca, R. R. ; Kirkpatrick, C. ; Asbeck, P. M. ; Eisen, F. H. ; Lee, C. P. ;

REPORT NO. MRDC41070.25FR

CONTRACT NO. F49620-80-C-0101, ARPA Order-3384

PROJECT NO. 3384

TASK NO. 04

MONITOR: AFOSR  
TR-84-0230

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Appendix A, AD-A139 677.

ABSTRACT: (U) This report covers a program designed to realize the full potential of GaAs integrated circuits by expanding and improving fabrication and material techniques. The main accomplishment of the program was the successful implementation of the fabrication of integrated circuits on 3-inch diameter GaAs wafers. In addition, this program covered many activities related to GaAs IC processing. These include: work on semi-insulating material growth and characterization, investigation of ion implantation techniques (work carried out at the California Institute of Technology); evaluation of device uniformity, and investigation of its controlling factors; investigation of metallization yield and reliability, and improvements of processing techniques resulting from this study; design and testing of a multiplier and programmable shift registers/pattern generators; evaluation of mask programmable logic arrays to meet ERADCOMS needs for high performance communication systems; investigation of the hardness of GaAs ICs to total dose and transient ionizing radiation, and

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AD-A139 676 CONTINUED

AD-A139 675 8/11 18/3

modelling of MESFET devices (this work carried out at North Carolina State University). (Author)

DESCRIPTORS: (U) \*Integrated circuits, \*Gallium arsenides, \*Ion implantation, \*Field effect transistors, \*Silicon nitrides, Logic circuits, Ion beams, Single crystals, Ionizing radiation, Communication equipment, Processing equipment, Monte Carlo method, Digital systems, Substrates, Etching, Deposition, Depletion, Insulation, Alignment, Resolution, Masks, Transients, Sputtering, Reactivities, Annealing, Materials, Dislocations, Metallizing

IDENTIFIERS: (U) LSI(Large Large Integration), VLSI(Very Large Scale Integration), Horizontal bridgeman method, Programming(Mask), Arrays(Logic), WUAFOSR338404, PE61102F

COOPERATIVE INST FOR RESEARCH IN ENVIRONMENTAL SCIENCE BOULDER CO

(U) Deterministic Methods of Seismic Source Identification.

DESCRIPTIVE NOTE: Annual technical rept. 1 Oct 82-30 Sep 83,

SEP 83 111P

PERSONAL AUTHORS: Archambeau, C. B. ;

CONTRACT NO. F49620-83-C-0009, ARPA Order-4889

PROJECT NO. 2309

TASK NO. A1

MONITOR: AFOSR  
TR-84-0229

#### UNCLASSIFIED REPORT

ABSTRACT: (U) In this report, we describe specific research results in: (1) The theoretical basis for seismic event discrimination and for the inference of physical parameters describing seismic sources; (2) Observations of body wave magnitude residuals in the U.S. and Southern Canada and the implications for yield estimation at non-U.S. and/or U.S. test sites; (3) Inferences of magnitude-yield relationships for both U.S. and U.S.S.R. test areas, with applications of these relations to U.S. and Russian nuclear test observations, to obtain new yield estimates; (4) Studies of a variety of physical situations which would produce seismic observations for an earthquake making it appear anomalous (i.e., explosion-like) when viewed from the perspective of standard discrimination methods, and similarly physical situations were described for which explosions could appear earthquake-like, and which could also lead to large yield estimate errors.

DESCRIPTORS: (U) \*Seismic waves, Sources, Discrimination, Identification, Yield(Nuclear explosions), Nuclear explosion testing, Earthquakes

IDENTIFIERS: (U) Body waves, WUAFOSR2309A1, PE61102F

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AD-A139 665 10/1

AD-A139 664 12/1

STANFORD UNIV CA DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Control and Dissipation in Oscillatory Chemical Engines,

(U) Path Integral Solutions of Stochastic Equations for Nonlinear Irreversible Processes: The Uniqueness of the Thermodynamic Lagrangian,

AUG 81 23P

JUL 81 10P

PERSONAL AUTHORS: Richter, P. H. ; Rehms, P. ; Ross, J. ;

PERSONAL AUTHORS: Hunt, K. L. C. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. 81

TASK NO. 81

MONITOR: AFOSR  
TR-84-0195MONITOR: AFOSR  
TR-84-0188

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Progress of Theoretical Physics, v66 n2 p385-405 Aug 81.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v75 n2 p976-984, 15 Jul 81.

Reprint: Control and Dissipation in Oscillatory Chemical Engines.

Reprint: Path Integral Solutions of Stochastic Equations for Nonlinear Irreversible Processes: The Uniqueness of the Thermodynamic Lagrangian.

DESCRIPTORS: (U) \*Engines, \*Energy conversion, Chemical engineering, Oscillation, Chemical reactions, Control, Dissipation, Models, Chemical equilibrium, Entropy, Efficiency, Kinetics, Reprints

DESCRIPTORS: (U) \*Integral equations, \*Stochastic processes, \*Differential equations, Nonlinear systems, Irreversible processes, Lagrangian functions, Thermodynamics, Reprints

IDENTIFIERS: (U) Chemical engines, WUAFOSR2303B1, PE61102F

IDENTIFIERS: (U) \*Stochastic equations, WUAFOSR2303B1, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 663 12/1

AD-A139 662 7/4

STANFORD UNIV CA DEPT OF CHEMISTRY

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Path Integral Solutions for Fokker-Planck Conditional Propagators in Nonequilibrium Systems: Catastrophic Divergences of the Onsager-Machlup-Laplace Approximation.

(U) Kinetics of Phase Transitions: Theory of Ostwald Ripening.

OCT 83 8P

JUL 83 7P

PERSONAL AUTHORS: Hunt, P. M. ; Hunt, K. L. C. ; Ross, J. ;

PERSONAL AUTHORS: Marqusee, J. A. ; Ross, J. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0125

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. B1

MONITOR: AFOSR  
TR-84-0202MONITOR: AFOSR  
... 84-0201

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v79  
n8 p3765-3772, 15 Oct 83.

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v79  
n1 p373-378, 1 Jul 83.

Reprint: Path Integral Solutions for Fokker-Planck Conditional Propagators in Nonequilibrium Systems: Catastrophic Divergences of the Onsager-Machlup-Laplace Approximation.

Reprint: Kinetics of Phase Transitions: Theory of Ostwald Ripening.

DESCRIPTORS: (U) \*Fokker Planck equations, \*Stochastic processes, \*Approximation(Mathematics), Mathematical models, Solutions(General), Scattering, Thermodynamics, Reprints

DESCRIPTORS: (U) \*Reaction kinetics, \*Phase transformations, Phase, Separation, Precipitation, Patterns, Rings, Time, Scaling factors, Time dependence, Distribution functions, Particle size, Equations, Nucleation, Diffusion, Asymptotic normality, Reprints

IDENTIFIERS: (U) WUAFOSR2303B1, PEB1102F

IDENTIFIERS: (U) Ostwald ripening, Liesegang rings, WUAFOSR2303B1, PEB1102F

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AD-A139 662

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 661 7/4

AD-A139 660 7/4

STANFORD UNIV CA DEPT OF CHEMISTRY

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Theory of Ostwald Ripening: Competitive Growth and Its Dependence on Volume Fraction,

(U) Increased Electrochemical Window in Ambient Temperature Neutral Ionic Liquids,

JAN 84 9P

83 3P

PERSONAL AUTHORS: Marqusee, J. A. ; Ross, J. ;

PERSONAL AUTHORS: Lipsztajn, M. ; Osteryoung, R. A. ;

CONTRACT NO. AFOSR-81-0125

CONTRACT NO. AFOSR-81-0007

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B1

TASK NO. A1

MONITOR: AFOSR  
TR-84-0211

MONITOR: AFOSR  
TR-84-0216

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n1 p536-543, 1 Jan 84.

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Electrochemical Society, v130 n9 p1968-1969, 1983.

Reprint: Theory of Ostwald Ripening: Competitive Growth and Its Dependence on Volume Fraction.

Reprint: Increased Electrochemical Window in Ambient Temperature Neutral Ionic Liquids.

DESCRIPTORS: (U) \*Colloids, \*Nucleation, Growth(General), Phase, Separation, Drops, Particles, Evolution(General), Surfaces, Volume, Ratios, Free energy, Reduction, Chemical equilibrium, Condensation, Evaporation, Solubility, Density, Amplitude, Distribution functions, Reprints

DESCRIPTORS: (U) \*Fused salts, \*Electrochemistry, \*Windows, Melts, Chemical composition, Aluminum compounds, Chlorides, Low temperature, Neutral, Anodes, Cathodes, Oxidation reduction reactions, Reprints

IDENTIFIERS: (U) \*Ostwald ripening, WUAFOSR2303B1, PE61102F

IDENTIFIERS: (U) WUAFOSR2303A1, PE61102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 640 12/1

AD-A139 639 4/1

SYRACUSE UNIV NY SCHOOL OF COMPUTER AND INFORMATION  
SCIENCE

HAYSTACK OBSERVATORY WESTFORD MA

(U) Interim Report for Grant AFOSR-82-0146, May 16, 1982-  
May 15, 1983.

(U) Millstone Hill Studies of the Trough: Boundary between  
the Plasmopause and Magnetosphere or Not?

DESCRIPTIVE NOTE: Final rept.,

DEC 83 8P

JUN 83 15P

PERSONAL AUTHORS: Holt, J. M.; Evans, J. V.; Wand, R. H.;

PERSONAL AUTHORS: Mehrotra, K. G.;

CONTRACT NO. AFOSR-83-0002

CONTRACT NO. AFOSR-82-0146

PROJECT NO. 2310

PROJECT NO. 2304

TASK NO. A2

TASK NO. A5

MONITOR: AFOSR  
TR-84-0225

MONITOR: AFOSR  
TR-84-0177

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Radio Science, v18 n6 p947-  
954 Nov-Dec 83.

UNCLASSIFIED REPORT

ABSTRACT: (U) The properties of a new rank statistic for  
comparing two populations in an arbitrary right censoring  
sampling scheme were investigated. The new statistic is  
an extension of the locally most powerful rank statistic  
for uncensored data and an extension of the well-known  
Wilcoxon statistic. The power of the new statistic was  
compared with the Prentice statistic for a sample size of  
10 and the new statistic was generally of slightly higher  
power for the logistic alternatives investigated. The  
investigators are optimistic that the statistic will  
remain more powerful against other alternatives. (Author)

DESCRIPTORS: (U) Rank order statistics,  
\*Population(Mathematics), Comparison, Sampling,  
Hypotheses, Distribution functions, Random variables,  
Estimates, Asymptotic normality

IDENTIFIERS: (U) Wilcoxon statistic, Efrons statistic,  
Prentices statistic, PE61102F, WUAFOSR2304A5

Reprint: Millstone Hill Studies of the Trough: Boundary  
between the Plasmopause and Magnetosphere or Not?

DESCRIPTORS: (U) \*Troughs, \*F region, Aurorae,  
Convection, Incoherent scattering, Radar, Magnetosphere,  
Reprints

IDENTIFIERS: (U) Plasmopause, PE61102D, WUAFOSR2310A2

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

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AD-A139 470 5/9

NEW YORK UNIV NY COURANT INST OF MATHEMATICAL SCIENCES

SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FL(U) Kinetic Theory of Gases, Magneto-Fluid Dynamics and  
Their Application.(U) The United States Air Force Graduate Student Summer  
Support Program (1983). Technical Report.DESCRIPTIVE NOTE: Interim technical rept. 1 Dec 82-30 Nov  
83.

DESCRIPTIVE NOTE: Final rept.,

JAN 84 16P

OCT 83 1281P

PERSONAL AUTHORS: Grad, H. ;

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Otis, A. L. ;

CONTRACT NO. AFOSR-81-0020

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A4

TASK NO. D5

MONITOR: AFOSR  
TR-84-0184MONITOR: AFOSR  
TR-84-0152

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) The areas covered in this report are (1) mathematical theory of queer differential equations; (2) universal solutions in multidimensional diffusion equations; (3) exact integrals of the Emden-Fowler equation; (4) new results in the theory of turbulent self-diffusion; and (5) mathematical theory of the essential spectrum in magnetohydrodynamics. (Author)

DESCRIPTORS: (U) \*Kinetic theory, \*Gases,  
\*Magnetohydrodynamics, \*Equations, Fluid dynamics,  
Diffusion, Integrals, Turbulence

IDENTIFIERS: (U) Queer differential equations, EMDEN  
Fowler equation, PE61102F, WUAFOSR2304A4

ABSTRACT: (U) A pilot program for Graduate Student Summer Support via the AFOSR Summer Faculty Research Program (SFRP) was initiated by contract modification on 26 March 1982. The program was developed as an adjunct effort to the SFRP. Its purpose is to provide funds for selected graduate students to work at an appropriate Air Force Laboratory or Center with a supervising professor who holds a concurrent SFRP appointment. SCEE appointed 17 graduate students representing fifteen (15) schools and ten (10) disciplines in science and engineering in the 1982 Program. In 1983 the program was expanded to 53 students representing 38 schools and 18 disciplines. The 53 participants were selected from 117 applicants. To be eligible, all candidates had to be currently registered in a graduate program. The graduate students were selected from the fields of engineering, computer science, mathematics, or the physical sciences and were supervised by a faculty member who held an appointment as a SCEE Fellow for the summer of 1983 under the Summer Faculty Research Program. The students were U.S. citizens, working toward an appropriate graduate degree, and currently enrolled in the graduate school at their respective institutions. (Author)

DESCRIPTORS: (U) \*Education, \*Research management, \*Air  
Force facilities, \*Laboratories, Students, Learning,

AD-A139 616

AD-A139 470

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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Computers, Engineering, Mathematics, Physical sciences,  
Schools, Teaching methods, Pilot studies, Air Force  
research, Management planning and control

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF  
CHEMISTRY

(U) Detection of Sputtered Neutrals by Multi-Photo  
Resonance Ionization.

IDENTIFIERS: (J) Graduate education

DESCRIPTIVE NOTE: Technical rept.,

83 9P

PERSONAL AUTHORS: Kimock, F. M. ; Baxter, J. P. ; Winograd, N.

REPORT NO. TR-2

CONTRACT NO. N00014-83-K-0052, AFOSR-82-0057

MONITOR: AFOSR  
TR-84-0300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Nuclear Instruments and  
Methods in Physics Research, v218 p287-292 1C:3.

Reprint: Detection of Sputtered Neutrals by Multi-Photo  
Resonance Ionization.

DESCRIPTORS: (U) \*Ionization, \*Photons, \*Resonance, \*Ion  
bombardment, \*Sputtering, Indium, Indium phosphides,  
Neutral, Ejection, Surfaces, Detection, Configurations,  
Pulses, Time, Metals, Oxygen, Exposure(General), Mass  
spectroscopy, Reprints

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SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FLSOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FL(U) United States Air Force Summer Faculty Research  
Program (1983). Technical Report. Volume 2.(U) United States Air Force Summer Faculty Research  
Program (1983). Technical Report. Volume 1.

DESCRIPTIVE NOTE: Final rept.,

DESCRIPTIVE NOTE: Final rept.,

DEC 83 1159P

DEC 83 1251P

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Otis, A. L. ;

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Otis, A. L. ;

CONTRACT NO. F49620-82-C-0035

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2301

PROJECT NO. 2301

TASK NO. D5

TASK NO. D5

MONITOR: AFOSR  
TR-84-0155MONITOR: AFOSR  
TR-84-0154

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1. AD-A139 403.

SUPPLEMENTARY NOTE: See also Volume 2. AD-A139 404.

ABSTRACT: (U) The United States Air Force Summer Faculty Research program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by the Southeastern Center for Electrical Engineering. (Author)

ABSTRACT: (U) The United States Air Force Summer Faculty Research program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten-week assignment during the summer intersession period to perform research at Air Force laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty members and the Air Force. In addition to compensation, travel and cost of living allowances are also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research, Air Force Systems Command, United States Air Force, and is conducted by the Southeastern Center for Electrical Engineering. (Author)

DESCRIPTORS: (U) \*Research management, \*Instructors, \*Summer, Schools, Air Force facilities, Air Force research, Scientists, Engineers, Laboratories, Universities

DESCRIPTORS: (U) \*Research management, \*Instructors, \*Summer, Schools, Air Force facilities, Air Force research, Scientists, Engineers, Laboratories, Universities

IDENTIFIERS: (U) SFRP(Summer Faculty Research Program),  
UNCLASSIFIED REPORT

IDENTIFIERS: (U) SFRP(Summer Faculty Research Program),  
UNCLASSIFIED REPORT

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A139 398 9/4 9/3

AD-A139 366 5/1 5/9

MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND  
COMPUTER ENGINEERING

SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FL

(U) A Study of Error Detection and Correction Codes.

(U) United States Air Force Summer Faculty Research  
Program (1983). Program Management Report.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Feb 83-31 Jan  
84.

DESCRIPTIVE NOTE: Final Rept.,

JAN 84 6P

DEC 83 179P

PERSONAL AUTHORS: Wolf, J. K. ;

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Otis, A. L. ;

CONTRACT NO. AFOSR-82-0061

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2304

PROJECT NO. 2301

TASK NO. A6

TASK NO. D5

MONITOR: AFOSR  
TR-84-0171

MONITOR: AFOSR  
TR-84-0153

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Research was continued on the study of  
error detecting and error correcting codes for achieving  
the reliable transmission or storage of information over  
a noisy communications channel or imperfect memory. Three  
specific research areas were investigated. These were: (1)  
The design and performance evaluation of error detecting  
codes; (2) Decoding strategies for redundant discrete  
Fourier transform codes and their applications to impulse  
noise cancellation; and (3) Coding and decoding of  
convolutional codes. (Author)

ABSTRACT: (U) The program provides opportunities for  
research in the physical sciences, engineering, life  
sciences, business, and administrative sciences. The  
program has been effective in providing basic research  
opportunities to the faculty of universities, colleges,  
and technical institutions throughout the United States.  
The program is available to faculty members in all  
academic grades: instructor, assistant professor,  
associate professor, professor, department chairman, and  
research facility directors. It has proven especially  
beneficial to young faculty members who are starting  
their academic research programs and to senior faculty  
members who have spent time in university administration  
and are desirous of returning to scholarly research  
programs. Beginning with the 1982 program, research  
opportunities were provided for 17 graduate students. The  
1982 pilot student program was judged highly successful  
and was expanded for the 1983 program to 53 students.

DESCRIPTORS: (U) \*Error detection codes,  
\*Reliability(Electronics), Data transmission systems,  
Data storage systems, Impulse noise, Cancellation,  
Decoding, Redundancy, Discrete fourier transforms, Coding,  
Performance tests, Communication and radio systems,  
Channels, Convolution

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

DESCRIPTORS: (U) \*Research management, \*Air Force  
research, Summer, Schools, Instructors, Students,  
Physical sciences, Life sciences, Engineering,  
Administrative personnel

IDENTIFIERS: (U) \*Summer faculty research program,  
PE61102F, WUAFOSR2301D5

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SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FL

Force facilities, Laboratories, Students, Personnel  
development, Engineering, Computers, Mathematics,  
Physical sciences, Management planning and control, Human  
resources, Pilot studies

(U) The United States Air Force Graduate Student Summer  
Support Program (1983) Management Report.

DESCRIPTIVE NOTE: Final rept.,  
IDENTIFIERS: (U) Scientific research, Graduate education,  
PE61102F, WUAFO5R2301D5

OCT 83 110P

PERSONAL AUTHORS: Peele, W. D. ; Steele, E. L. ; Otis, A. L. ;

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2301

TASK NO. D5

MONITOR: AFOSR  
TR-84-0151

#### UNCLASSIFIED REPORT

ABSTRACT: (U) A pilot program for Graduate Student Summer Support via the Air Force Office of Scientific Research Summer Faculty Research Program (SFRP) was initiated by contract modification on 26 March 1982. The program was developed as an adjunct effort to the SFRP. Its purpose is to provide funds for selected graduate students to work at an appropriate Air Force Laboratory or Center with a supervising professor who holds a concurrent SFRP appointment. SCEE appointed 17 graduate students representing fifteen (15) schools and ten (10) disciplines in science and engineering in the 1982 program. In 1983 the Program was expanded to 53 students representing 36 schools and 18 disciplines. The 53 participants were selected from 117 applicants. To be eligible, all candidates had to be currently registered in a graduate program. The graduate students were selected from the fields of engineering, computer science, mathematics, or the physical sciences and were supervised by a faculty member who held an appointment as a SCEE Fellow for the summer of 1983 under the Summer Faculty Research Program. The students were U.S. citizens, working toward an appropriate graduate degree, and currently enrolled in the graduate school at their respective institutions. (Author)

DESCRIPTORS: (U) \*Education, \*Research management, \*Air

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A139 358 8/13

STANFORD UNIV CA DEPT OF MATERIALS SCIENCE AND  
ENGINEERING

APPLIED RESEARCH ASSOCIATES INC ALBUQUERQUE NM

(U) An Investigation of the Structure and High Temperature  
Mechanical Properties of Oxide Dispersion Strengthened  
Alloys.

(U) Fundamental Properties of Soils for Complex Dynamic  
Loadings; Dynamic Constitutive Model Fundamentals.

DESCRIPTIVE NOTE: Annual Technicl rept. no. 3, 1 Aug 82-  
31 Jul 83.

DESCRIPTIVE NOTE: Interim scientific rept. 1 Oct 82-30  
Sep 83.

DEC 83 125P

FEB 84 47P

PERSONAL AUTHORS: Merkle, D. H. ; Dass, W. D. ;

PERSONAL AUTHORS: Nix, W. D. ;

CONTRACT NO. F49620-80-C-0088

CONTRACT NO. AFOSR-81-0022

PROJECT NO. 2307

PROJECT NO. 2306

TASK NO. C1

TASK NO. A1

MONITOR: AFOSR

TR-84-0166

MONITOR: AFOSR

TR-84-0163

UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) The structure and high temperature  
mechanical properties of oxide dispersion strengthened  
alloys are being studied. We have observed and studied  
superplastic properties in fine grained MA 6000 and MA  
754. These properties have been described by a model  
which couples dislocation and diffusional creep. The  
creep properties of coarse grained MA 754 are also being  
studied. We have observed that cavitation contributes to  
the creep rate at low stresses and high temperatures and  
that grain boundary degradation occurs by diffusional  
processes. Work on the structure and properties of Al-Fe-  
Ce alloys is just starting. (Author)

ABSTRACT: (U) This report discussed the physical basis  
for the equations describing the dynamic response of a  
saturated soil. Next, the principal stress-strain  
features which a soil constitutive model may have to  
reproduce are reviewed. Finally, the basic equations of  
elastoplasticity are derived, existing failure criteria  
are reviewed, and a new failure criterion is presented.

DESCRIPTORS: (U) \*Soil dynamics, Soils, Saturation,  
Loads(Forces), Stresses, Strain(Mechanics), Elastic  
properties, Plastic properties, Dynamic response

IDENTIFIERS: (U) Saturated soils, WUAFOSR2307C1,  
PE61102F

DESCRIPTORS: (U) \*Alloys, \*Superalloys, \*Dispersion  
hardening, \*Strength(Mechanics), \*Stresses, \*Mechanical  
properties, High temperatures, Oxides, Creep, Creep  
strength, Plastic properties, Aluminum alloys, Cerium  
alloys, Iron alloys, Dislocations, Diffusion, Cavitation,  
Grain boundaries, Degradation

IDENTIFIERS: (U) WUAFOSR2306A1, PE61102F

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DREXEL UNIV PHILADELPHIA PA DEPT OF MECHANICAL  
ENGINEERING AND MECHANICS

IDENTIFIERS: (U) WUAFOSR2307B2, PE81102F

(U) Fracture Mechanics of Sublaminar Cracks in Composite  
Laminates.

DESCRIPTIVE NOTE: Interim rept. Oct 82-Feb 83.

FEB 83 69P

PERSONAL AUTHORS: Wang, A. S. D. ;

CONTRACT NO. F49620-79-C-0208

PROJECT NO. 2307

TASK NO. B2

MONITOR: AFOSR  
TR-84-0168

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the AGARD Structural  
and Materials Specialists Meetings, England, 10-15 Apr 83.

ABSTRACT: (U) This paper presents an overview of a  
fracture mechanics approach to some of the most  
frequently encountered matrix-dominated, sub-laminate  
cracks in epoxy-based composite laminates. By 'sub-  
laminate', it is meant that the cracks are internal to  
the laminate, generally invisible macroscopically; but  
are much larger in size than those microcracks considered  
in the realm of micromechanics. The origin of sub-  
laminate cracks is assumed to stem from the coalescence  
of natural flaws (also microcracks) which occur under a  
certain favorable laminate stress condition. Thus, the  
modelling of the mechanisms of sub-laminate crack  
initiation and propagation is essentially mechanistic and  
probabilistic in nature. Some specific results form  
several analytical/experimental investigations using  
graphite-epoxy laminates are presented and discussed in  
this paper. (Author)

DESCRIPTORS: (U) \*Composite materials, \*Epoxy laminates,  
\*Graphited materials, \*Fracture(Mechanics),  
Cracking(Fracturing), Failure(Mechanics),  
Defects(Materials), Cracks, Microcracking, Stresses.  
Mechanical engineering

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TEXAS UNIV AT AUSTIN DEPT OF PHYSICS

(U) Theoretical Studies of Solids under Extreme Conditions. Predictions, Superconductivity, Surfaces, Transition temperature, Transition metals, Alloys, Coherent radiation, Magnetic moments, Transport properties

DESCRIPTIVE NOTE: Annual scientific rept. 1 Dec 82-31 Nov 83. IDENTIFIERS: (U) WJAFDSR2301A6, PE61102F

DEC 83 16P

PERSONAL AUTHORS: Fry, J. L.; Fletcher, G.; Ray, A. K.;

CONTRACT NO. AFOSR-83-0050

PROJECT NO. 2301

TASK NO. A6

MONITOR: AFOSR  
TR-84-0158

# UNCLASSIFIED REPORT

ABSTRACT: (U) During the period Dec. 1, 1982 to Nov. 31, 1983 theoretical studies of energetic solids and solids at low temperature began. Major state-of-the-art quantum chemistry codes were implemented for the task of determining activation energies of explosive molecules and solids. Extensive studies of the R-N02 molecular species concluded the most previous work based upon a single determinant wavefunction is wrong: even the ground state of these molecules required a multi-configurational description. The generalized valence bond method has been employed successfully to describe a large number of molecules and offers hope of understanding some of the much more complex energetic molecules which are important because of their general use. Studies of the electron phonon interaction have resulted in a new, efficient formulation of the problem. Theoretical prediction of the superconducting transition temperature base upon accurate description of the electron phonon interaction has been completed for a number of transition metals and their alloys. Studies of surface superconductivity and investigation of coherent radiation from molecules at solid surfaces have also begun. (Author)

DESCRIPTORS: (U) \*Explosives, \*Solids, \*Energetic properties, High pressure, Low temperature, Electrons, Phonons, Interactions, Quantum chemistry, Activation energy, Molecules, Molecular properties, Valence,

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TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMISTRY

(U) Nanosecond Current Probe for High-Voltage Experiments.

(U) Preparation and Properties of Dibismuthines.

JAN 84 3P

83 9P

PERSONAL AUTHORS: Krompholz, H. ; Doggett, J. ; Schoenbach, K. H. ; Gahl, J. ; Harjes, C. ;

PERSONAL AUTHORS: Ashe, A. J. , III ; Ludwig, E. G. , Jr. ; Oleksyszyn, J. ;

CONTRACT NO. F49620-79-C-0191

CONTRACT NO. AFOSR-81-0099

PROJECT NO. 2301

PROJECT NO. 2303

TASK NO. A7

TASK NO. B2

MONITOR: AFOSR  
TR-84-0169

MONITOR: AFOSR  
TR-84-0146

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SUPPLEMENTARY NOTE: Pub. in Review of Scientific Instruments, v55 n1 p127-128 Jan 84.

SUPPLEMENTARY NOTE: Pub. in Organometallics, v2 n12 p1859-1866 1983.

Reprint: Nanosecond Current Probe for High-Voltage Experiments.

Reprint: Preparation and Properties of Dibismuthines.

DESCRIPTORS: (U) \*Pulse transformers, \*Probes, Transmission lines, Electric coils, High voltage, Impedance matching, Inductance, Capacitance, Test methods, Reprints

DESCRIPTORS: (U) \*Bismuth compounds, \*Organometallic compounds, Synthesis (Chemistry), Methyl radicals, Propyl radicals, Sodium, Ammonia, Chlorine, Ethanes, Freezing, Red (Color), Blue (Color), Raman spectroscopy, Ultraviolet spectroscopy, Mass spectroscopy, Thermochemistry, Reprints

IDENTIFIERS: (U) Rogowski coils, Current probes, Rise times, Pulse instrumentation, Integrating coils, Propagation velocities, Current pulses, Coaxial cavities, Slow wave lines, WJAFOSR2301A7, PEG1102F

IDENTIFIERS: (U) Dibismuthines, PEG1102F, WJAFOSR2303B2

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14/2

TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL EN/ NEEKING

(U) Photodetachment as a Control Mechanism for Diffuse Discharge Switches.

DEC 83 4P

DESCRIPTIVE NOTE: Final rept. 1 Jul 79-31 Dec 83,

PERSONAL AUTHORS: Schaefer, G. ; Williams, P. F. ; Schoenbach, K. H. ; Moseley, J. T. ;

FEB 84 392P

PERSONAL AUTHORS: Kristiansen, M. ; Hagler, M. ; Craig, J. ; Hatfield, L. ; Schaefer, G. ;

CONTRACT NO. F49620-79-C-0191

PROJECT NO. 2312

CONTRACT NO. F49620-79-C-0191, MIPR-16-81

TASK NO. A5

PROJECT NO. 2301

MONITOR: AFOSR

TASK NO. A7

TR-84-0145

MONITOR: AFOSR, ARO

TR-84-0174, 17829.11-PH

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Plasma Science, V-PS-11 n4 p263-265 Dec 83.

Reprint: Photodetachment as a Control Mechanism for Diffuse Discharge Switches.

DESCRIPTORS: (U) \*Glow discharges, \*Laser applications, Ion exchange, Oxygen, Laser beams, Reprints

IDENTIFIERS: (U) Photodetachment, WUAFOSR2312A5, PEG1102F

UNCLASSIFIED REPORT

ABSTRACT: (U) The work on eight program elements, related to pulsed power, research over the past four years is summarized. These program elements form a multidisciplinary, coordinated program whose main emphasis is to gain improved understanding of high power, repetitive closing and opening switches. The main emphasis is concerned with triggering of discharges in gas filled spark gaps and the associated electrode erosion and insulator damage. Considerable efforts are also being made to understand the limitations and fundamental discharge phenomena in fast opening switches for inductive energy storage. A novel electromechanical pulse generator which promises to deliver fast, repetitive pulses has also been investigated. The major, overall, accomplishments in each program element are summarized and last year's work is described in some detail. (Author)

DESCRIPTORS: (U) \*Pulse generators, \*Switching circuits, \*Energy storage, \*Spark gaps, \*Gas discharges, \*Electronic switches, Breakdown(Electronic threshold), Laser beams, Electron beams, Trigger circuits, Electromechanical devices, Opening(Process), Electromechanical converters, Transients, Pulse rate, Surfaces, Spectroscopy, Research management, Filling, Erosion, Power, Pulses, Excitation, Physics, Switches, Gases

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AD-A139 306 9/2 9/5 12/1

IDENTIFIERS: (U) Closing switches, Inductive storage,  
Closing(Process), Opening switches, WUAFOSR2301A7,  
PE61102F

MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION  
RESEARCH

(U) On Mapping Cube Graphs on VLSI Array and Tree  
Architectures.

DESCRIPTIVE NOTE: Technical rept.,

DEC 83 34P

PERSONAL AUTHORS: Ramakrishnan, I. V. ; Varman, P. J. ;

REPORT NO. CAR-TR-40, CS-TR-1358

CONTRACT NO. F48620-83-C-0082

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rice  
Univ., Houston, TX. Dept. of Electrical Engineering.

ABSTRACT: (U) We formalize a model of array  
architectures suitable for VLSI implementation. A formal  
model of an arbitrarily structured tree machine is also  
presented. A mathematical framework is developed to  
transform cube graphs, which are data-flow descriptions  
of certain matrix computations, onto the array and tree  
models. All published algorithms for these computations  
can be obtained using the mathematical framework. In  
addition, novel linear-array algorithms for matrix  
multiplication are obtained. More importantly, the  
algorithms obtained for the tree model are of special  
significance. Besides their novelty, the independence of  
the tree algorithms from a specific inter-processor  
communication geometry make them robust to hardware  
faults as opposed to algorithms that are based on  
specific interconnection requirements. (Author)

DESCRIPTORS: (U) \*Trees, \*Processing equipment, \*Graphs,  
\*Arrays, \*Integrated circuits, \*Computer architecture,  
Algorithms, Mapping, Circuit interconnections,  
Computations, Faults, Requirements, Models, Architecture

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MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE

IDENTIFIERS: (U) Global clocks, VLSI(Very Large Scale Integration), Rectangular arrays, Tree machines, Hexagonal arrays, Liner arrays, Cube graphs, Array algorithms, Pipelining, WUAFOSR2304A2, PE61102F

(U) Formal Specification and Verification of Distributed System.

DESCRIPTIVE NOTE: Technical rept.,

JUN 83 49P

PERSONAL AUTHORS: Chen, B. S. ; Yeh, R. T. ;

REPORT NO. TR-1295

CONTRACT NO. F49620-80-C-0001

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0172

#### UNCLASSIFIED REPORT

ABSTRACT: (U) Computations of distributed systems are extremely difficult to specify and verify using traditional techniques because the systems are inherently concurrent, asynchronous, and nondeterministic. Furthermore, computing nodes in a distributed system may be highly independent of each other, and the entire system may lack an accurate global clock. In this thesis, we develop an event-based model to specify formally the behavior (the external view) and the structure (the internal view) of distributed systems. Both control-related and data-related properties of distributed systems are specified using two fundamental relationships among events: the 'precedes' relation, representing time order; and the 'enables' relations, representing causality. No assumption about the existence of a global clock is made in the specifications.

DESCRIPTORS: (U) \*Distributed data processing, \*Computers, \*Systems engineering, Data transmission systems, Performance(Engineering), Computer architecture, Message processing, Computations, Specifications, Validation, Models, Interfaces, Programming languages, Communications networks

IDENTIFIERS: (U) WUAFOSR2304A2, PE61102F

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TEXAS TECH UNIV LUBBOCK DEPT OF ELECTRICAL ENGINEERING

AD-A139 298 20/8 14/5  
STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Pulse Flashover of Solid Dielectrics in Vacuum.

(U) Photoacoustic Imaging.

DESCRIPTIVE NOTE: Annual rept. 30 Jun 82-29 Jun 83.

JUN 83 6P

PERSONAL AUTHORS: Jackson, G. L.; Hatfield, L. L.;  
Kristiansen, M.; Marx, J.; Bowling, A.;

DEC 83 38P

PERSONAL AUTHORS: Quate, C. F.;

CONTRACT NO. F49620-79-C-0191

REPORT NO. GL-3672

PROJECT NO. 2301

CONTRACT NO. AFOSR-82-0248

TASK NO. A7

PROJECT NO. 2308

MONITOR: AFOSR

TR-84-0170

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on  
Electrical Insulation, VEI-18 n3 p310-314 Jun 83.

Reprint: Pulse Flashover of Solid Dielectrics in Vacuum.

DESCRIPTORS: (U) \*Dielectrics, \*Surface properties,  
\*Breakdown(Electronic threshold), Vacuum apparatus,  
Pulses, Spark gaps, High power, Reprints

IDENTIFIERS: (U) Pulse flashover, Insulators, Vacuum  
flashover, Solid dielectrics, SEM(Scanning Electron  
Microscopes), Voltage pulses, PE81102F, WUAFOSR2301A7

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ABSTRACT: (U) This report includes a description of two  
new high frequency photoacoustic and photothermal imaging  
systems developed in the reporting period. Also included  
is a photoacoustic study of laser recrystallized silicon,  
and an extension to three dimensions of the theory of  
thermo-acoustic generation in solids. (Author)

DESCRIPTORS: (U) \*Image processing, \*Acoustooptics,  
\*Photographic images, High frequency, High resolution,  
Photothermal properties, Interactions, Semiconductor  
lasers, Silicon, Recrystallization, Opacity, Substrates,  
Solids, Dense gases, Three dimensional,  
Coupling(Interaction), Quartz, Thin films

IDENTIFIERS: (U) \*Photoacoustics, PE81102F,  
WUAFOSR2306A2

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MICHIGAN UNIV ANN ARBOR DEPT OF PHYSICS

FLORIDA UNIV GAINESVILLE DEPT OF ENGINEERING SCIENCES

(U) The Detection of Faint Space Objects Using Solid State Imaging Detectors.

(U) Dynamic Response of Concrete and Concrete Structures.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 83,

DESCRIPTIVE NOTE: Annual rept. no. 1, 1 Dec 82-30 Nov 83,

DEC 83 22P

JAN 84 50P

PERSONAL AUTHORS: Hegyi, D. J. ;

PERSONAL AUTHORS: Malvern, L. E. ; Ross, C. A. ;

CONTRACT NO. AFOSR-80-0095

CONTRACT NO. F49620-93-K-0007

PROJECT NO. 2311

PROJECT NO. 2307

TASK NO. A1

TASK NO. C2

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0165

TR-84-0159

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ABSTRACT: (U) Speckle interferometry has been carried out during the last year with a charge-coupled device (CCD) imaging system. The emphasis of this project has been to minimize all systematic differences that arise between the images of stars in a binary star system and a reference calibration star in order to resolve a previously unresolved binary star system. Systematic errors have been minimized to the level of parts in 10,000 in the power spectrum of a stellar image. This was accomplished by using a 64x64 pixel area near the readout amplifier to minimize charge smearing, by stabilizing our CCD system to the level of a few parts in 100,000, and by using a prism system to compensate for atmospheric dispersion. (Author)

DESCRIPTORS: (U) \*Binary stars, Star trackers, Solid state electronics, Stellar atmospheres, Image processing, Space objects, Power spectra, Charge coupled devices, Interferometry, Errors

IDENTIFIERS: (U) Stellar images, Speckle interferometry, PEB1102F, WUAFOSR2311A1

ABSTRACT: (U) This report describes the first-year activity of a three-year research program whose objectives are to (1) Develop a loading function for close proximity explosions, (2) Determine dynamic strength properties for selected types of concrete, and (3) Incorporate the strength properties so determined into a localized failure criterion for reinforced concrete, (4) Use a structural analysis elastic/plastic finite element computer program to determine localized response for a concrete/steel finite element mesh, and (5) Combine all of these into a simple structural analysis program to determine response of underground structures to localized impulsive loads. A new Kolsky Bar System (Split Hopkinson's Bar) is being built to test concrete specimens up to 3 inches in diameter. A pilot program testing 0.75-inch diameter specimens in an existing Kolsky Bar System has shown a linear dependence of the unconfined compressive strength of mortar on the strain rate at the maximum stress. The pilot program has been useful for guiding the design of the new larger system.

DESCRIPTORS: (U) \*Concrete, \*Dynamic response, Structures, Reinforced concrete, Loads(Forces), Stresses, Failure(Mechanics), Structural analysis, Strength(Mechanics), Test methods

IDENTIFIERS: (U) PEB1102F, WUAFOSR2307C2

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NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Constitutive Models for Static and Dynamic Response of Geotechnical Materials.

DESCRIPTIVE NOTE: Final scientific rept. 1 Oct 78-30 Sep 83.

NOV 83 276P

PERSONAL AUTHORS: Nemat-Nasser, S. ;

CONTRACT NO. AFOSR-80-0017

PROJECT NO. 2307

TASK NO. C1

MONITOR: AFOSR

TR-84-0161

UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research program has been to develop realistic macroscopic constitutive relations which describe static and dynamic properties of geotechnical materials (soils and rocks). To this end a coordinated theoretical and experimental activity has been followed. The theoretical work includes a balanced combination of statistical microscopic (at the grain size level) modeling and a nonclassical elasto-plastic macroscopic formulation. The latter includes the effects of internal friction, plastic compressibility, and pressure sensitivity, as well as anisotropy which is commonly observed in geotechnical materials. The following specific goals have been sought: (a) to develop three-dimensional constitutive relations under ordinary or high pressures (such as those induced by blasting or tectonic forces which may cause a large amount of densification by relative motion and possible crushing of grains); and (b) to examine and characterize the behavior of saturated granular materials under dynamic loading. The latter item includes characterization of possible liquefaction and subsidence which may be induced in granular materials under confining pressure by ground vibration or passage of waves. The theoretical work has been carefully coordinated with key experiments in order to: (a) understand the basic physics of the process, both at macroscopic and microscopic levels; (b) to verify the

corresponding theoretical predictions; and (c) to establish relevant material parameters.

DESCRIPTORS: (U) \*Soil mechanics, \*Rock mechanics, Soils, Rock, Shear properties, Density, Modification, Sand, Resistance, Brittleness, Crack propagation, Strain(Mechanics), Shear properties, Failure(Mechanics), Plastic properties, Stresses, Pressure, Temperature

IDENTIFIERS: (U) Liquefaction(Soils), Densification, PEB1102F, WUAFOSR2307C1

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LEHIGH UNIV BETHLEHEM PA DEPT OF METALLURGY AND  
MATERIALS ENGINEERING

(U) A Study of Fatigue Crack Propagation in Powder  
Metallurgy Hot Isotatically Pressed Nickel-Base Alloy.

\*Nickel alloys, \*Superalloys, \*Powder metallurgy, Hot  
pressing, Isostatic pressing, Grain size, Grain  
structures(Metallurgy), Distribution, Temperature,  
Fatigue tests(Mechanics), Strain(Mechanics), Loads(Forces)  
, Cyclic tests, Microstructure, Dislocations, Computer  
applications

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 83,

IDENTIFIERS: (U) PE61102F, WUAFOSR230FA1

JAN 84 11P

PERSONAL AUTHORS: Hertzberg, R. W. ;

CONTRACT NO. AFOSR-83-0029

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR  
TR-84-0164

#### UNCLASSIFIED REPORT

ABSTRACT: (U) Initial efforts were addressed at the preparation of powders that would result in the development of HIP'd logs possessing a large range of grain sizes and grain size distributions. After several trials, it was determined that the widest range of alloy grain size could be obtained by using different HIPing temperatures in conjunction with different solution treatments (ST). The following treatments and grain sizes are identified: (1107 C HIP + 1121 C ST (ASTM No. 13)), (1107 C HIP + 1149 C ST (Duplex size ASTM average 8-9)), (1107 C HIP + 1177 C ST (ASTM No. 6-8.5)); (1246 C HIP + 1149 C ST (ASTM No. 4)). Further aging treatments are planned at 650 C and 800 C to obtain fine and coarse gamma precipitate sizes, respectively. Initial fatigue crack propagation tests were completed with both material and computer-controlled test system performing in a well behaved manner. Crack closure measurements were obtained which allowed crack growth rate data to be compared with delta K sub eff. Grips and fixtures have been designed and ordered which will permit cyclic strain experiments to be conducted at both room and elevated temperatures. Techniques were developed to prepare thin foils to allow for detailed examination of alloy microstructures and cyclic load-induced dislocation structures.

DESCRIPTORS: (U) \*Fatigue(Mechanics), \*Crack propagation,

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NATIONAL RESEARCH COUNCIL WASHINGTON DC COMMITTEE ON  
LINE SPECTRA OF THE ELEMENTS-ATOMIC SPECTROSCOPY

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

(U) Current Trends in Atomic Spectroscopy. Report on a  
Workshop Held in Tucson, Arizona, October 24-26, 1982.

(U) Very Large Array Observations of Solar Active Regions.  
DESCRIPTIVE NOTE: Interim scientific rept. 1 Jan-30 Dec  
83,

DESCRIPTIVE NOTE: Final rept. 1 May 82-31 May 83,

84 93P

JAN 84 77P

PERSONAL AUTHORS: Reed, C. K. ;

PERSONAL AUTHORS: Lang, K. R. ;

CONTRACT NO. AFOSR-82-0172

CONTRACT NO. AFOSR-83-0019

PROJECT NO. 2301

PROJECT NO. 2311

TASK NO. A4

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0157

TR-84-0162

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SUPPLEMENTARY NOTE: Original contains color plates: All  
DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) This report expresses the collective  
opinion of the workshop participants that the areas  
covered are representative of the best work going on in  
atomic spectroscopy. In discussing current trends and  
future goals for research, we have tried to share with  
the reader our appraisal of where the field is and where  
it is going. This report has been prepared with the  
intention that it be an aid to funding agencies in  
assessing research proposals and to management at  
research institutions in guiding research carried out in  
their facilities. (Author)

DESCRIPTORS: (U) \*Atomic spectroscopy, Research  
management, Workshops, Patterns, Atomic spectra

IDENTIFIERS: (U) PEB1102F, WUAFOSR2301A4

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AD-A139 189 20/5 9/2

DESCRIPTORS: (U) \*Solar activity, Solar disturbances,  
Arrays, Solar flares, Magnetic fields, Plasma diagnostics

ILLINOIS UNIV AT URBANA DEPT OF AERONAUTICAL AND  
ASTRONAUTICAL ENGINEERING

IDENTIFIERS: (U) Coronal loops, PE81102F, WUAFOSR2311A1

(U) Nonlinear Interactions between the Pumping Kinetics,  
Fluid Dynamics and Optical Resonator of cw Fluid Flow  
Lasers.

DESCRIPTIVE NOTE: Final technical rept.,

DEC 83 51P

PERSONAL AUTHORS: Sentman, L. H. ; Nayfeh, M. H. ;

REPORT NO. AAE-83-10, UIIU-ENG-83-0510

CONTRACT NO. AFOSR-80-0133

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR  
TR-84-0147

UNCLASSIFIED REPORT

ABSTRACT: (U) This research is an integrated theoretical and experimental investigation of the nonlinear interactions which may occur between the chemical kinetics, the fluid dynamics and the unstable resonator of a continuous wave fluid flow laser. The objectives of this grant were to measure the frequency and amplitude of the time dependent pulsations in the power spectral output which have been predicted to occur in cw chemical lasers employing unstable resonators to extract power.

DESCRIPTORS: (U) \*Continuous wave lasers, \*Power spectra, \*Interactions, \*Nonlinear analysis, \*Computerized simulation, Fluid flow, Fluid dynamics, Kinetics, Laser pumping, Optical properties, Experimental data, Resonators, Chemical lasers, Time dependence, Oscillation, Pulses

IDENTIFIERS: (U) Pulsation, Computer models, Optical resonators, WUAFOSR2303B1, PE81102F

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SEARCH CONTROL NO. 038187

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JET PROPULSION LAB PASADENA CA AD-A139 182 CONTINUED

(U) Non-Steady Combustion of Composite Solid Propellants.

DESCRIPTIVE NOTE: Final research progress rept. 1 Mar-30 Sep 82,

MAY 83 32P

PERSONAL AUTHORS: Cohen, N. S. ; Strand, L. D. ;

REPORT NO JPL-D-708

CONTRACT NO. AFOSR-ISSA-82-00030

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR  
TR-84-0167

UNCLASSIFIED REPORT

ABSTRACT: (U) An analytical model for the linearized velocity-coupled combustion response function was developed. The model combines elements of response to velocity perturbations, pressure perturbations, and compositional perturbations due to the heterogeneity of composite propellants. The important effects of AP size distribution are accounted for in terms of effects on ballistics properties and in terms of periodic fluctuations in propellant composition. Properties of the response function have been calculated theoretically over a range of the governing variables. There are two facets of the crossflow problem: the response to velocity perturbations, and the effect of crossflow velocity on the various response elements. The crossflow mechanism is heuristically based upon the so-called 'Soderholm erosive burning law,' but which has been given physical significance in the theoretical work of Kuo. Significant results are described. In addition, the triggered non-linear instability experiments performed at CARDE were reviewed and shown to depend upon the achievement of a formulation-dependent critical velocity in the rocket motor. Progress was made in the measurement of the pressure-coupled response functions of propellants formulated to seek out the effects of AP particle size. Progress was made toward formulating a high frequency

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combustion response model applicable to nitramine/minimum-smoke propellants.

DESCRIPTORS: (U) \*Composite propellants, \*Combustion stability, \*Mathematical models, Combustion, Solid rocket propellants, Ammonium perchlorate, Oxidizers, Particle size, Distribution, Heterogeneity, Concentration(Composition), Burning rate, Formulations, Variations, Pressure, Coupling(Interaction)

IDENTIFIERS: (U) WJAFOSR2308A1, PEB1102F

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A138 999 20/4

AD-A138 999 CONTINUED

LEHIGH UNIV BETHLEHEM PA DEPT OF MECHANICAL ENGINEERING  
AND MECHANICS

(U) Experimental Observations of Vortex Ring Interaction  
with the Fluid Adjacent to a Surface.

DESCRIPTIVE NOTE: Interim rept.,

OCT 83 189P

PERSONAL AUTHORS: Cerra, A. W., Jr.; Smith, C. R. ;

REPORT NO. FM-4

CONTRACT NO. F49620-78-C-0071

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR  
TR-84-0130

# UNCLASSIFIED REPORT

**ABSTRACT:** (U) Experimental studies examined the breakdown of initially laminar vortex rings during impact with both solid and free surfaces in a quiescent environment, and with a solid surface beneath a developing laminar boundary layer. Flow interactions were visualized in water using dye and hydrogen-bubble techniques and recorded with a high-speed video system. When a vortex ring approaches a surface the resulting flow interaction appears to be chaotic and turbulent, but is actually a very organized viscous-inviscid process which rapidly disperses the vorticity of the vortex ring throughout the surrounding fluid. Described is the flow interaction which integrates the following phenomena: (1) generation of secondary vorticity of opposite sense to that of the vortex ring; (2) deviations in the trajectory of the vortex ring from that predicted by classical theory; and (3) the processes of organized dispersal of vorticity. The process by which vorticity dispersal occurs is dependent upon the initial Reynolds number (Re sub 0) of the vortex ring. For very weak rings, i.e. Re sub 0 less than 350, vorticity is dispersed by laminar diffusion. For stronger rings, vorticity dispersal occurs discretely through formation of secondary and tertiary vortex rings (SVR and TVR) via a viscous boundary layer

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process. Vorticity dispersal continues as a result of Biot-Savart-type interactions of the SVR and TVR with the original or primary vortex ring. During this interaction the diameter of the SVR is compressed, causing an instability in the SVR which is characterized by an azimuthal waviness.

**DESCRIPTORS:** (U) \*Vortices, \*Boundary layer, \*Laminar flow, Rings, Impact, Surfaces, Interactions, Laminar boundary layer, Viscous flow, Inviscid flow, Secondary flow, Dispersing, Deformation, Circulation, Waves, Reynolds number, Water flow, Flow visualization, Dyes, Bubbles, Hydrogen, High speed photography, Water tunnels

**IDENTIFIERS:** (U) \*Vortex ring interactions, Flow instabilities, Free surfaces, Velocity gradients, Instability, Quiescent flow, PE61102F, WUAFOSR2307A2



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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A138 998 20/6

AD-A138 926 20/4

OPTICAL SOCIETY OF AMERICA WASHINGTON D C

CINCINNATI UNIV OH DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS

(U) Topical Meeting on Optical Bistability Held at Rochester, New York on 15-17 June 1983.

(U) Second Order Composite Velocity Solution for Large Reynolds Number Flows.

DESCRIPTIVE NOTE: Final rept. 1 Jun 83-31 Jan 84.

NOV 83 13P

83 236P

PERSONAL AUTHORS: Quinn, J. W. ;

PERSONAL AUTHORS: Rubin, S. G. ; Celestina, M. ; Khosla, P. K. ;

CONTRACT NO. AFOSR-83-0251

CONTRACT NO. AFOSR-80-0047

PROJECT NO. 2301

PROJECT NO. 2307

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR TR-84-0114

MONITOR: AFOSR TR-84-0116

UNCLASSIFIED REPORT

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ABSTRACT: (U) The topical meeting on optical bistability was intended to provide an international interdisciplinary forum for the exchange of knowledge on the progress of various aspects of optical bistability and optical nonlinearities. Papers in the following areas were covered: theory, experiments, devices, material properties, instabilities and chaos and coherent switching. (Author)

DESCRIPTORS: (U) \*Optical properties, \*Nonlinear systems, \*Bistable devices, Stability, Switching, Materials, Coherence

IDENTIFIERS: (U) Optical bistability, Coherent switching, Chaos, PE81102F, WUAFOSR2301A1

SUPPLEMENTARY NOTE: Pub. in Proceedings of AIAA Aerospace Sciences Meeting (21st) Reno, NV, Jan 84.

ABSTRACT: (U) The composite velocity procedure is applied to a reduced form of the Navier-Stokes equations where viscous effects are neglected only in the normal momentum equation. Subsonic and mildly transonic flows are considered for boattail and airfoil geometries. The composite formulation defines viscous and potential-like velocity components. These variables are coupled in a strongly implicit solution procedures (CSIP) and simulate a coupled interacting boundary layer-potential flow solver with a single system of equations. Complete second-order accurate solutions are obtained for laminar and turbulent flows where separation bubbles and weak shocks are present. The effects of inflow and outflow boundary conditions are examined and a procedure for reducing storage of the CSIP is presented. (Author)

DESCRIPTORS: (U) \*Viscous flow, Transonic flow, Velocity, Reynolds number, flow separation, Airfoils, Boattail afterbodies, Navier Stokes equations

IDENTIFIERS: (U) Composite velocity, PE81102F, WUAFOSR2307A1

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AD-A138 919 CONTINUED

CARNEGIE-MELLON UNIV PITTSBURGH PA

(U) A Program of Research on Microfabrication Techniques  
for VLSI Magnetic Devices.

DESCRIPTIVE NOTE: Interim progress rept. 30 Sep 82-29 Sep 83.

NOV 82 20P

PERSONAL AUTHORS: Kryder, M. H. ; Krafft, C. S. ; Saunders, D. A. ; Alex, M. ; Jo, S. ;

PROJECT NO. 2305

TASK NO. C1

MONITOR: AFOSR  
TR-84-0108

DESCRIPTORS: (U) \*Garnet, \*Magnetic materials, \*Magnetic devices, \*Bubble memories, \*Magneto-optics, Microelectronics, Fabrication, Memory devices, Ion implantation, Magnetic disks, Integrated circuits, Logic circuits, Gates(Circuits), Electric charge, Walls, Thin films, Electron microscopy, Amorphous materials

## UNCLASSIFIED REPORT

ABSTRACT: (U) New materials, new means of fabrication, and new device structures for high density magnetic bubble devices are being pursued. A large portion of the research is directed at ion implanted contiguous disk devices which offer sixteen times the bit density of permalloy devices now being sold by U.S. OEM manufacturers. The effects on ion implantation on garnet are being studied with the goal of developing improved garnet materials and fabrication techniques for submicrometer bubble size devices. The behavior of charged walls which act to propagate the bubble domains in these devices is being investigated and correlated with the ion implantation, mask pattern design, and device performance. Unique work with transmission electron microscopy in ion implanted garnets has enabled us to directly observe structural changes produced by ion implantation in patterned devices. During the past year 0.5 micrometer bubbles were propagated in ion implanted contiguous disk devices. Work is being carried out on current-access perforated-sheet technology which offers four times the bit density of presently manufactured devices and order of magnitude higher data rate. During the past year bubble logic gates were demonstrated in this technology. Finally a current-access ion-implanted device structure which offers the high density of field-access contiguous-disk technology and the high performance of current-access technology is being pursued.

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AD-A138 876 CONTINUED

ARKANSAS UNIV FAYETTEVILLE DEPT OF ELECTRICAL  
ENGINEERING

systems, Quantization, Low rate, Data rate, Signal  
processing, Adaptive systems, Hybrid systems,  
Computerized simulation, Electrical engineering,  
Histograms, Subroutines

(U) Adaptive Hybrid Picture Coding.

DESCRIPTIVE NOTE: Interim rept. 1 Apr-30 Nov 83,

IDENTIFIERS: (U) Image coding, ASPC(Adaptive Stochastic  
Picture Coding), AHPC(Adaptive Hybrid Picture Coding  
System), PE61102F, WUAFOSR2305B3

NOV 83 198P

PERSONAL AUTHORS: Jones, R. A. ; Cook, M. K. ;

CONTRACT NO. AFOSR-82-0351

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR  
TR-84-0142

#### UNCLASSIFIED REPORT

**ABSTRACT:** (U) The transmission of digital imagery has become a necessity in recent times. Systems such as communications and weather satellites, facsimile, remote control, and machine intelligence can and do make use of data compression techniques to reduce bandwidth and power consumption. Research on these techniques has led to one form of image data compression which achieves good image quality for intraframe coding at low data rates. This technique is known as Adaptive Stochastic Picture Coding (ASPC) which consists of a one-dimensional unitary transform for column-wise decorrelation used in conjunction with Adaptive Differential Predictive Coding Modulation (ADPCM) for the row-wise decorrelation, followed by quantization to give the desired data compression. This system requires use of quantization techniques which limit system performance. Optimization of adaptive scalar quantizers and use of vector quantizers aid in the adaptation of the system to variations in the image statistics. This report represents a study of such quantizers in the ASPC system. By examining these quantization methods, it will be shown that it is vital that the proper quantizer be incorporated into the system to achieve a particular data rate at desired distortion levels. (Author)

**DESCRIPTORS:** (U) \*Mathematical models, \*Image processing,  
\*Data compression, \*Coding, \*Pictures, \*Data transmission

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NEW MEXICO UNIV ALBUQUERQUE DEPT OF CHEMICAL AND NUCLEAR  
ENGINEERING WUAFOSR2301A7

(U) Physics of High Temperature, Dense Plasmas.

DESCRIPTIVE NOTE: Final Rept. 1 Feb 79-30 Jun 82,

JAN 84 173P

PERSONAL AUTHORS: Woodall, D. M. ;

CONTRACT NO. AFOSR-79-0080

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR  
TR-84-0124

#### UNCLASSIFIED REPORT

**ABSTRACT:** (U) The research undertaken under the AFOSR Grant included three related projects: the production and characterization of a dense plasma target for a Relativistic Electron Beam (REB)-Plasma and REB-Neutral Gas heating experiment, the development of plasma diagnostics for REB-Plasma and REB-Neutral Gas heating experiments, and finally, the development of soft x-ray diagnostic techniques of imploding liner experiments. This report has three principal sections. Section II, Characterization of a Dense Plasma Source, summarizes the results of the plasma gun research activities undertaken. That work was in the plasma target production and characterization area for planned REB-Plasma heating experiments. Section III, Intense REB-Neutral Gas Heating Experiments, details the result of diagnostic development for experiments performed in this area. Section IV, Space and Time Resolved Spectroscopy of High Energy Density Aluminum Plasmas, presents results of such measurements made on the plasma produced by the SHIVA imploding foil experiment.

**DESCRIPTORS:** (U) \*Plasmas(Physics). \*High temperature, \*Dense gases, Soft x rays, X ray diagnostics, Plasma diagnostics, Electron beams, Spectroscopy, High energy, Gas heating

**IDENTIFIERS:** (U) Relativistic electron beams, PEG1102F,

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MIAMI UNIV FLA DEPT OF ANESTHESIOLOGY

airways is discussed.

(U) Modeling of Inhalation Administration of Vapors with Capacity Limited Clearance.

DESCRIPTORS: (U) \*Inhalation, \*Toxicity, \*Mathematical models, \*Vapors, Metabolism, Simulation, Computerized simulation, Metabolites, Tissues(Biology), Rats

DESCRIPTIVE NOTE: Final scientific rept. 30 Jun 81-31 Aug 83.

IDENTIFIERS: (U) Halothane, Isoflurane, PE81102F, WUAFOSR2312A5

AUG 83 100P

PERSONAL AUTHORS: Thomas, V. ;

CONTRACT NO. AFOSR-81-0210

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR  
TR-84-0125

#### UNCLASSIFIED REPORT

ABSTRACT: (U) The overall objective of the project was to design economical and informative testing of subacute and chronic toxicity of new volatile substances. The specific objectives were: (1) to prepare a mathematical model for simulation of uptake, distribution, and elimination of vapors with capacity-limited clearance; (2) to obtain experimental data supporting the model; (3) to study the factors affecting nonlinearity of clearance (concentration dependence, interference of inhalation of other vapors). The main accomplishments are: (1) A program for mathematical solution of a multi-compartmental model for simulation of uptake, distribution, and elimination of vapors having a capacity limited elimination pathway was prepared for the Apple II plus computer and tested by simulating a variety of trichloroethylene and halothane exposures. (2) Three methods for determination of metabolic clearance were tested: (a) systemic clearance was determined from the concentration differences in inhaled air and arterial blood; (b) intrinsic clearance in organs was determined from distribution of inhaled chemicals in the body during steady state; (c) intrinsic clearance by each metabolic pathway was determined from distribution and elimination of metabolites. (3) The retention of vapors of water soluble chemicals in trachea was determined and the significance of retention of chemicals in respiratory

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A138 814 20/5

HUGHES RESEARCH LABS MALIBU CA

STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

(U) Real-Time Implementation of Nonlinear Optical Processing Functions.

(U) Anomalous Laser Induced Bunch Lengthening on the ACO Storage Ring Free Electron Laser.

DESCRIPTIVE NOTE: Annual technical rept. 15 Jun 82-15 Jun 83,

DESCRIPTIVE NOTE: Interim rept.,

DEC 83 43P

APR 83 6P

PERSONAL AUTHORS: Soffer, B. H. ;

PERSONAL AUTHORS: Robinson, K. E. ; Madey, J. M. J. ; Veighe, M. F. ; Deacon, D. A. G. ;

CONTRACT NO. F49620-81-C-0088

REPORT NO. HEPL-929

PROJECT NO. 2305

CONTRACT NO. F49620-80-C-0088

TASK NO. 81

PROJECT NO. 2301

MONITOR: AFOSR

TASK NO. A1

TR-84-0141

MONITOR: AFOSR  
TR-84-0103

## UNCLASSIFIED REPORT

ABSTRACT: (U) Optical data processing has not yet achieved its potential of increased capacity and speed compared with conventional electronic techniques, primarily for lack of a practical real-time image modulator, and because optical techniques have been almost exclusively limited to linear operations. The continuing research outlined in this report attacks these issues by studying the implementation of real-time nonlinear parallel-processing techniques. The various implementations studied in this program all employed real-time liquid-crystal light valves developed and specially modified for these tasks.

DESCRIPTORS: (U) \*Optical processing, \*Nonlinear systems, \*Data processing, \*Real time, Parallel processing, Optical data, Liquid crystals, Holography, Gratings(Spectra), Substrates, Transformations

IDENTIFIERS: (U) Light valves, \*Optical data processing, VGM(Variable Grating Mode), PEG1102F, WUAFOSR2305B1

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SUPPLEMENTARY NOTE: Presented at the Particle Accelerator Conference, Mar 83, Santa Fe, NM. Prepared in cooperation with Paris Univ. Orsay (France). Laboratoire de Photophysique Moleculaire and Deacon Research, Palo Alto, CA.

ABSTRACT: (U) Laser induced bunch lengthening has been measured on the ACO Storage Ring Free Electron Laser (SRFEL) in the anomalous bunch lengthening regime. The experimental results show correlations between the appearance of coherent modes in the electron bunch and anomalous behavior in the presence of the laser. Simultaneous time resolved laser induced bunch lengthening, mode strength, bunch length, and synchrotron sideband measurements were made as anomalous thresholds were traversed several times by changing the ring laser accelerating voltage. Bunch shortening, multiple time constants, and oscillatory behavior are among the phenomena which have been observed. (Author)

DESCRIPTORS: (U) \*Laser applications, \*Ring lasers, Coupling(Interaction), Electron beams, Anomalies, Length, Oscillation, Experimental data

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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IDENTIFIERS: (U) Free electron lasers, Laser induced  
bunch lengthening, PE81102F, WUAFSDR2301A1

STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

(U) Design and Operating Experience on Laser Cavity in a  
Vacuum of 10-10 TORR,

FEB 83 2P

PERSONAL AUTHORS: Velghe, M. ;

CONTRACT NO. F49620-80-C-0068

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR  
TR-84-0104

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. de Physique, Conf c1  
suppl n2 v44 pc1-387 Feb 83.

Reprint: Design and Operating Experience on Laser Cavity  
in a Vacuum of 10-10 TORR.

DESCRIPTORS: (U) \*Laser cavities, Ring lasers, Vacuum,  
Bellows, Mirrors, Length, Angles, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2301A1

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AD-A138 807

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20/4

TEXAS UNIV AT AUSTIN DEPT OF MECHANICAL ENGINEERING

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG  
CENTER FOR ENVIRONMENTAL STUDIES(U) Quantification of Subjective Ratings through Conjoint  
Measurement Analysis.

DESCRIPTIVE NOTE: Final rept..

NOV 83

39P

PERSONAL AUTHORS: Greene, D. E. ;

CONTRACT NO. AFOSR-82-0220

PROJECT NO. 2313

TASK NO. D9

MONITOR: AFOSR

TR-84-0126

## UNCLASSIFIED REPORT

ABSTRACT: (U) Conjoint measurement theory is examined through a prototype example in which a fighter aircraft is subjectively rated on two factors. As a first step, a multifactor ordinal scale is developed. This ordinal scale provides a meaningful measure of aircraft quality. Interval scales of aircraft quality are produced by the basic analysis of variance model and two conjoint measurement methods: delta scaling and the computer algorithm MONANOVA. These methods produce interval scales that differ by constant factors, as guaranteed by the theorem for additive conjoint measurement. The interval scale does not appear to be an improvement over the ordinal scale in the prototype example. There is no assurance that a specific conjoint measurement model can be used to improve the data. Major changes in the interval scales are caused by small perturbations in the rating matrix. (Author)

DESCRIPTORS: (U) \*Flight envelope, Quality control, Algorithms, Fighter aircraft, Pilots, Handling, Human factors engineering, Scaling factors, Ranking

IDENTIFIERS: (U) Conjoint measurement theory.

WUAFOSR2313D9, PE61102F

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(U) Sublethal Effects of JP-4 on Aquatic Organisms and  
Communities.

DESCRIPTIVE NOTE: Annual rept. no. 2, 1 Nov 82-31 Oct 83,

JAN 84 64P

PERSONAL AUTHORS: Cairns, J. , Jr.; Bulkema, A. L. , Jr.;  
Doane, T. R. ; Neiderlehner, B. R. ;

CONTRACT NO. AFOSR-82-0059

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR  
TR-84-0118

## UNCLASSIFIED REPORT

ABSTRACT: (U) In the second year of the AFOSR grant to examine the sublethal effects of water soluble fraction (WSE) of JP-4 jet fuel we have completed most of the work on the petroleum derived JP-4. Fractionators have been built and used to generate constant concentrations of the WSE JP-4 that were used to determine the lethal and sublethal effects on bluegill sunfish (*Lepomis macrochirus*) and selected aquatic invertebrates. The dynamic 96 hour LC50 for the WSE JP-4 for the bluegill was determined to be 26.2%. (This is percent of the maximum soluble amount of JP-4.) The concentration of the WSE JP-4 which causes a detectable shift in the ventilatory functions (rate and amplitude) was determined to be 5.1% WSE. In the second year of research producing cultures of aquatic invertebrates were established, and through test systems were designed and constructed, and toxicity tests with the water soluble fraction (WSE) of petroleum JP-4 were begun with 3 invertebrates, the oligochaete, *Aelosoma headleyi*, a benthic collector gatherer; the cladoceran *Daphnia pulex*, a planktonic filter-feeding crustacean; and, the dipteran *Paratanytarsus parthogenica* (Freeman) (= *Tanytarsus dissimilis* Joh.), a substrate associated collector gatherer.



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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A138 807 CONTINUED

DESCRIPTORS: (U) \*Toxicity, \*Jet engine fuels,  
\*Sublethal dosage, \*Aquatic organisms, Fishes,  
Invertebrates, Lethality, Ventilation, Rates,  
Concentration(Chemistry), Exposure(General),  
Response(Biology), Detection, Blood, Osmosis, Histology,  
Metabolism, Liver, Test methods, Microorganisms

IDENTIFIERS: (U) Lepomis macrochirus, WUAFOSR2312A5,  
PE61102F

AD-A138 806 5/10

BERNARD M BARUCH COLL NEW YORK DEPT OF PSYCHOLOGY  
(U) Hemispheric Asymmetries in a Signal Detection Task,  
83 8P

PERSONAL AUTHORS: Andreassi, J. L. ; Rebert, C. S. ; Larsen, F.  
F. ;

CONTRACT NO. F49620-80-C-0013, PHS-NS12591

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR  
TR-84-0128

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Perceptual and Motor Skills,  
V57 P823-928 1983

Reprint: Hemispheric Asymmetries in a Signal Detection  
Task.

DESCRIPTORS: (U) \*Performance(Human),  
\*Perception(Psychology), \*Cues(Stimuli), \*Reaction time,  
Response, Reaction(Psychology), Visual perception, Signal  
processing, Psychophysiology, Reprints

IDENTIFIERS: (U) Neurophysiology, Signal detection,  
WUAFOSR2313A4, PE61102F

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AD-A138 795 CONTINUED

GEORGE WASHINGTON UNIV WASHINGTON D C SCHOOL OF  
ENGINEERING

IDENTIFIERS: (U) Vortex ring formation, Laminar vortex  
rings, Translational kinetic energy, WUAFOSR2307A1,  
PE61102F

(U) Energetics of Vortex Ring Formation.

DESCRIPTIVE NOTE: Interim rept.,

NOV 83 7P

PERSONAL AUTHORS: Irdumsa, J. Z. ; Garris, C. A. ;

CONTRACT NO. F49620-80-C-0043

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR  
TR-84-0110

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents an experimental investigation comparing the mass and energy content of fully formed laminar vortex rings in air with that of the original pulse which generated them for a variety of initial and boundary conditions. In particular, the fractional entrainment of mass and the partition of initial energy between kinetic energy of translation and kinetic energy of rotation is studied. It is found that a large degree of control can be exercised for the determination of the vortex energetics, as well as its final configuration. A technique is presented which enables calculation of kinetic energy of rotation from movie sequences. The ratio of characteristic translational speed to characteristic rotational speed is shown to be a useful parameter for correlation of data. Data on vortex size and speed are presented using this correlation and it is seen that all data, regardless of initial and boundary conditions, fall on a single curve. A theoretical curve is derived and it is seen that the data compare well with it. (Author)

DESCRIPTORS: (U) \*Vortices, Laminar flow, Rings, Energy transfer, Mass, Entrainment, Air flow, Rotation, Energetic properties, Kinetic energy, Pulses, Mathematical models, Boundary value problems, Correlation, Chimneys, Thrust augmentation, Air ejectors, Motion pictures

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

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AD-A138 749 7/4 20/9

MINNESOTA UNIV MINNEAPOLIS DEPT OF MECHANICAL  
ENGINEERING

OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

(U) Film Cooling on a Gas Turbine Blade Near the End Wall.

(U) Scanning Electron Microscopic and X-Ray Photoelectron  
Spectroscopic Examination of Tokai Glassy Carbon  
Surfaces Subjected to Radio Frequency Plasmas.

DESCRIPTIVE NOTE: Interim rept..

MAY 83 10P

DEC 81 7P

PERSONAL AUTHORS: Goldstein, R. J.; Chen, H. P. ;

PERSONAL AUTHORS: Miller, C W.; Karwaik, D. H.; Kuwana, T. ;

CONTRACT NO. F49620-83-C-0062

CONTRACT NO. AFOSR-78-3872

PROJECT NO. 2307

PROJECT NO. 2303

TASK NO. A4

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0109

TR-84-0134

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Local film cooling effectiveness on a gas turbine blade with a row of discrete cooling jets was measured using a mass transfer technique. Emphasis is placed on phenomena near the end wall of the blade. This region contains a horseshoe vortex system modified by a passage vortex. On the concave (pressure) surface the film cooling performance is not greatly altered by the presence of the end wall. On the convex surface of the blade the film cooling is essentially absent in a triangular region extending from near the region of peak curvature on the blade to its trailing edge. This unprotected region closely corresponds to location of the passage vortex as indicated by flow visualization. The passage vortex sweeps away the injected coolant flow from the surface. Upstream of the unprotected area the injected flow is skewed toward the middle span of the blade. End wall influence extends about one-half cord length up from the end wall in the present experiments.

DESCRIPTORS: (U) \*Film cooling, \*Gas turbine blades, Walls, Vortices, Heat transfer, Surfaces, Curved profiles, Coolants, Injection, Jet flow, Internal

IDENTIFIERS: (U) End walls, Impingement heat transfer, Passage vortices, Concave surfaces, Convex surfaces, WUAFOSR2307A4, PEB1102F

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AD-A138 749

UNCLASSIFIED

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038187

SUPPLEMENTARY NOTE: Pub. in Analytical Chemistry, v53 n14, p2319-2323 Dec 81.

Reprint: Scanning Electron Microscopic and X-Ray Photoelectron Spectroscopic Examination of Tokai Glassy Carbon Surfaces Subjected to Radio Frequency Plasmas.

DESCRIPTORS: (U) \*Electron microscopy, \*X ray photoelectron spectroscopy, \*Glassy carbon, \*Radiofrequency pulses, \*Plasmas(Physics), Electrodes, Plasma generators, Surfaces, Erosion, Damage, Oxidation, Electrochemistry, Surface finishing, Surface chemistry, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A138 746 6/15 6/20

AD-A138 746 CONTINUED

ISTITUTO DI RICERCHE FARMACOLOGICHE MARIO NEGRI MILAN  
(ITALY)

Stimulation(Physiology), Toxicity, Rats, Atropine,  
Reserpine

(U) Anticholinesterase Effects on Number and Function of  
Brain Muscarinic Receptors and Central Cholinergic  
Activity: Drug Intervention.

IDENTIFIERS: (U) \*Dichlorovos, PE61102F, WUAFOSR2312A3

DESCRIPTIVE NOTE: Interim annual scientific rept. no. 1,  
1 Aug 82-31 Jul 83.

SEP 83 28P

PERSONAL AUTHORS: Ladinsky, H. ;

CONTRACT NO. AFOSR-82-0306

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR  
TR-84-0122

#### UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Review of Air Force  
Sponsored Basic Research in Biomedical Sciences, 26-28  
Jul 83, Irvine, CA.

ABSTRACT: (U) This study endeavors to elucidate the  
acute mechanisms adapted by the body to reduce  
cholinergic in order to fend off the toxic effects of  
anticholinesterase poisons. The effect of DDVP on rat  
brain acetylcholine content was characterized. The drug  
increased ACh in hemispheric structures (striatum,  
hippocampus, cortex) but not in cerebellum or midbrain-  
hindbrain. Pretreatments with atropine or reserpine only  
partially prevented the DDVP-induced increases. These and  
other experiments suggest that DDVP acted through a  
feedback mechanism secondarily to muscarinic receptor  
stimulation by the protected synaptic ACh. The feedback  
activation mediated by a monoamine leads to intraneuronal  
storage of ACh. Another fraction, perhaps smaller,  
accumulates extraneuronally and likely is responsible for  
the toxicity.

DESCRIPTORS: (U) \*Acetylcholine, \*Cholinesterase  
inhibitors, \*Muscarine, \*Organic phosphorus compounds,  
Brain, Chemoreceptors, Central nervous system,

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AD-A138 745 CONTINUED

IDENTIFIERS: (U) PE61102F, WUAFOSR2311A1

AD-A138 745 12/1 20/9 4/1

NEW YORK CITY TECHNICAL COLL BROOKLYN

(U) Dependence of Hydromagnetic Energy Spectra on Interplanetary Parameters.

DESCRIPTIVE NOTE: Final rept. 1 Sep 78-30 Sep 83.

NOV 83 7P

PERSONAL AUTHORS: Wolfe, A.; Lanzerotti, L. J.; MacLennan, C. G.; Medford, L. V.; Meloni, A.;

CONTRACT NO. AFOSR-78-3707

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR  
TR-84-0123

UNCLASSIFIED REPORT

ABSTRACT: (U) Ground-based magnetometer data, recorded at AT&T Bell Laboratories' stations located at low to mid-latitudes (L=2-4) and AFGL station (L=2-3), have been analyzed to search for associations between dayside Pc3-5 pulsations (15-240 second periods) and solar wind parameters measured by instrumentation on board the IMPJ spacecraft. The statistical analysis techniques used in the work (power spectral analysis, correlation analysis, multiple linear regression methods) have led to the discovery and quantification of relationships between hydromagnetic waves in the magnetosphere as manifested by magnetic pulsations and interplanetary parameters. Multiple linear regression (MLR) analyses showed that the most important interplanetary parameter controlling ground hourly magnetic energy (in the period range 60-240 seconds) was the solar wind speed. MLR analyses further showed that hourly magnetic energy in the 15-60 second period range was also controlled by the solar wind speed but more so by the interplanetary magnetic field direction.

DESCRIPTORS: (U) \*Statistical analysis, \*Statistical processes, \*Magnetohydrodynamic waves, \*Magnetosphere, Magnetometers, Magnetic fields, Solar wind, Parameters, Spacecraft

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

AD-A138 740 20/6 20/5 20/7  
STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

AD-A138 736 20/6 12/1  
ARIZONA UNIV TUCSON

(U) UV and VUV Degradation of Very High Reflectivity  
Mirrors for Use in a Storage Ring Free Electron Laser.

MAY 83 7P

PERSONAL AUTHORS: Elleaume, P.; Deacon, D. A. G.; Billardon,  
M.; Ortega, J. M.;

REPORT NO. HEPL-922

CONTRACT NO. F49620-80-C-0068

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR  
TR-84-0105

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Paris  
Univ. Orsay (France).

ABSTRACT: (U) TiO<sub>2</sub>/SiO<sub>2</sub> multilayer dielectric mirrors  
centered around 630 nm have shown reflectivity  
degradation from 99.99% down to 99.0% due to UV  
synchrotron radiation emitted by a beam of 240 MeV  
electrons during a storage ring free electron laser  
experiment.

DESCRIPTORS: (U) \*Mirrors, \*Lasers, \*Radiation damage,  
\*Ultraviolet radiation, \*Synchrotrons, Titanium oxides,  
Silicon dioxide, Dielectric properties, Reflectivity,  
Degradation, Ultraviolet equipment, Electron beams, Free  
electrons, Storage, Rings, Test methods

IDENTIFIERS: (U) Free electron lasers, PE61102F,  
WUAFOSR2301A1

AD-A138 740

## UNCLASSIFIED

AD-A138 736

(U) Feasibility Studies of Optical Processing of Image  
Bandwidth Compression Schemes.

DESCRIPTIVE NOTE: Annual rept.,

MAY 83 70P

PERSONAL AUTHORS: Hunt, B. R.; Strickland, R. N.;  
Schovengerdt, R. A.;

CONTRACT NO. AFOSR-81-0170

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR  
TR-84-0143

## UNCLASSIFIED REPORT

ABSTRACT: (U) This research focuses on these three areas:  
(a) formulation of alternative architectural concepts for  
image bandwidth compression, i.e., the formulation of  
components and schematic diagrams which differ from  
conventional digital bandwidth compression schemes by  
being implemented by various optical computation methods;  
(b) simulation of optical processing concepts for image  
bandwidth compression, so as to gain insight into typical  
performance parameters and elements of system performance  
sensitivity; and (c) maturation of optical processing for  
image bandwidth compression until the overall state of  
optical methods in image compression becomes equal to  
that of digital image compression. (Author)

DESCRIPTORS: (U) \*Optical processing, \*Images, \*Data  
compression, \*Numerical methods and procedures,  
\*Feasibility studies, Stationary, Bandwidth,  
Multispectral, Sampling, Schematic diagrams,  
Interpolation, Tomography, Convolution

IDENTIFIERS: (U) \*Image bandwidth compression, PE61102F,  
WUAFOSR2305B1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A138 725 CONTINUED

COLORADO UNIV AT BOULDER DEPT OF AEROSPACE ENGINEERING  
SCIENCES

Airfoils, Flow separation, Perturbation theory

IDENTIFIERS: (U) PEG1102F, WUAFQSR2307A2

(U) The Unsteady Boundary Layer on an Elliptic Cylinder  
Following the Impulsive Onset of Translational and  
Rotational Motion.

DESCRIPTIVE NOTE: Interim rept.,

JAN 83 10P

PERSONAL AUTHORS: Billings, D. F. ; Chow, C. Y. ;

CONTRACT NO. AFOSR-81-0037

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR  
TR-84-0043

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the AIAA Aerospace  
Sciences Meeting (21st), 10-13 Jan 83, Reno, NV.

ABSTRACT: (U) The fluid motion about an elliptic  
cylinder impulsively set into translational and  
rotational motion is obtained by the method of matched  
asymptotic expansions for small time and large Reynolds  
number. The constraint of the perturbation model is that  
the boundary layer thickness and the distance of travel  
are of the same asymptotic order. It is found that pitch-  
up motion or rotation accompanying translation at an  
angle of attack is indeed capable of preventing the early  
formation of a leading edge separation bubble. Even  
before evident in the streamline pattern, the incipient  
separation bubble is accompanied by a characteristic  
vorticity signature in the vicinity of the leading edge  
that is quite different from that with rotation. Further,  
the onset of an adverse pressure gradient is displaced  
rearward from its location for pure translation. The pre-  
Kutta condition lift evidently arises with the local  
acceleration that is a consequence of the displacement  
effect of the growing boundary layer. (Author)

DESCRIPTORS: (U) \*Boundary layer flow, Cylindrical  
bodies, Rotation, Motion, Unsteady flow, Angle of attack,

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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AD-A138 722 CONTINUED

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF  
MECHANICAL INDUSTRIAL AND AEROSPACE ENGINEERING

(U) Theoretical Investigation of Three-Dimensional Shock  
Wave-Turbulent Boundary Layer Interactions. Part 2.

predictions of the upstream propagation of the surface  
for the Reynolds number range investigated. An additional  
computation at Mach 2 was performed, and the results were  
in general in agreement with the previous conclusions.  
(Author)

DESCRIPTIVE NOTE: Annual interim rept. 1 Oct 82-30 Sep 83.

DESCRIPTORS: (U) \*Turbulent boundary layer, \*Shock waves,  
Three dimensional flow, Interactions, Navier Stokes  
equations, Flow fields, Thickness, Reynolds number,  
Supersonic flow

DEC 83 71P

PERSONAL AUTHORS: Knight, D. D. ;

REPORT NO. RU-TR-160-MAE-F

IDENTIFIERS: (U) Baldwin-Lomax model, PE81102F,  
WUAFOSR2307A1

CONTRACT NO. AFOSR-82-0040

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR  
TR-84-0113

# UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A127 118.

ABSTRACT: (U) The focus of the research effort is the  
understanding of three-dimensional shock wave-turbulent  
boundary layer interactions. The approach uses the full  
mean compressible Navier-Stokes equations with turbulence  
incorporated through the algebraic turbulent eddy  
viscosity model of Baldwin and Lomax. During the present  
year of the research effort, the three-dimensional shock  
boundary layer interaction generated by a 10 deg sharp  
fin has been computed at Mach 3 for a Reynolds number  
28 000. These results, together with previous  
computations of the same configuration at Reynolds number  
= 30000, are compared with experimental data for pitot  
pressure and yaw angle. The agreement with the  
experimental data is good, and the theory accurately  
predicts the recovery of the boundary layer downstream of  
the interaction of Reynolds number = 28000. The computed  
flowfield is employed to analyze the structure of the 3-D  
interaction through contour plots of flow variables. Also,  
during the present year, the investigation of the 2-D  
turbulent supersonic compression corner at Mach 3 was  
completed. The relaxation modification to the Baldwin-  
Lomax model was found to yield reasonably accurate

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MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA  
VALLEY FORGE RESEARCH CENTER

Random arrays, Large arrays, Angular resolution, PE81102F,  
WUAFOSR2305B1

(U) High Angular Resolution Microwave Sensing with Large,  
Sparse, Random Arrays.

DESCRIPTIVE NOTE: Final scientific rept. 1 Oct 81-30 Sep  
83.

NOV 83 235P

PERSONAL AUTHORS: Dorny, C. N. ;

REPORT NO. UP-VFRC-33-83

CONTRACT NO. AFOSR-82-0012

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR  
TR-84-0140

UNCLASSIFIED REPORT

ABSTRACT: (U) This document describes progress toward development of a general capability for high resolution microwave surveillance and imaging using large, sparse, self-cohering arrays. During the last five years progress has been made in the following areas: understanding of the unique advantages of large, self-cohering arrays; development of advances system concepts, including the air-borne radio camera; enhanced self-cohering capability and experimental demonstration of that capability; and development of techniques for improving microwave image quality, including handling of the high sidelobes associated with very sparse arrays. A number of other practical issues associated with large self-cohering arrays have also been examined.

DESCRIPTORS: (U) \*Radar antennas, \*Search radar, \*Sidelobes, \*Radar receivers, Antenna apertures, Microwave equipment, Test and evaluation, Radio equipment, Sparse matrix, High resolution, Test methods, L band, Microwaves, Augmentation, Images, Spaceborne, Arrays, Surveillance, Quality, Airborne

IDENTIFIERS: (U) Self cohering arrays, Sparse arrays.

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AD-A138 715 CONTINUED

## OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

transformed phenotype.

(U) Chemical Carcinogen-Induced Changes in tRNA Metabolism  
in Human Cells.

DESCRIPTORS: (U) \*Ribonucleic acids, \*Carcinogens, \*Metabolism, Cells(Biology), Humans

DESCRIPTIVE NOTE: Interim technical rept. 1 Oct 82-30 Sep 83.

IDENTIFIERS: (U) PE81102F, WUAFOSR2312A5, LPN-OSURF-76240, /713292

NOV 83 75P

PERSONAL AUTHORS: Treuyn, R. W. ;

CONTRACT NO. AFOSR-80-0283

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR  
TR-84-0117

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) It is hypothesized that transfer RNAs mediate endogenous promotion of carcinogenesis subsequent to chemical carcinogen initiation, and that without the appropriate changes in tRNA metabolism, the ultimate expression of the neoplastic state will not be attained. Current studies are concentrating on tRNA ribosyltransferase modification reactions which are considered to be the pivotal molecular aberrations in this process. A normal human cell culture model system responsive to phorbol ester tumor promoters was developed which allows the evaluation of the role of tRNA in promotion of carcinogenesis. Chronic exposure to the tumor promoters induces a transient 5 to 10-fold increase in the saturation density of human cells if the treatment is initiated at early population doublings in culture in medium supplemented with elevated levels of specific amino acids. A significant decrease in queuine modification in the anticodon of cellular tRNAs precedes the transient 5 to 10-fold increase saturation density, and queuine modification increases prior to the subsequent decrease in saturation density. The increase in queuine modification correlates to the induction of an endogenous queuine salvage pathway. Most importantly, the addition of excess exogenous queuine inhibits the transient increase in saturation density induced by the tumor promoters, i.e., it blocks the expression of a

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AD-A138 714 CONTINUED

CONNECTICUT UNIV STORRS INST OF MATERIALS SCIENCE

(U) The Fatigue of Powder Metallurgy Alloys.

composition, Powder alloys, Fractography, Loads(Forces),  
High strength alloys

IDENTIFIERS: (U) PE81102F, WUAFOSR2306A1

DESCRIPTIVE NOTE: Annual scientific rept. 1 Dec 82-30 Nov 83.

JAN 84 44P

PERSONAL AUTHORS: McEvilly, A. J. ;

CONTRACT NO. AFOSR-81-0046

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR  
TR-84-0111

UNCLASSIFIED REPORT

ABSTRACT: (U) Experimental work on the fatigue crack growth characteristics of high strength P/M (Powder Metallurgy) aluminum alloys has been extended, with particular attention given to crack closure in the near threshold region as a function of R. It has been conclusively shown that the R-dependence of the threshold level is directly related to closure. In the absence of closure as in ultra-fine grained material the threshold level is independent of the R-ratio. Experimental work has been initiated on the growth of fatigue cracks under variable amplitude loading conditions. An approach to deal with topics such as the anomalous growth of short cracks, the non-propagation of cracks from notches, fatigue notch sensitivity, and the notch size-effect in fatigue has been developed. A comparison of the fatigue behavior of powder metallurgy and ingot metallurgy products has been initiated. Thus far out work indicates that P/M products can be produced which are free from manufacturing defects which might degrade fatigue properties of these high strength aluminum alloys. The fatigue properties are responsive to grain size, fracture toughness, and the degree of closure developed.

DESCRIPTORS: (U) \*Aluminum alloys, \*Powder metallurgy, \*Fatigue(Mechanics), \*Crack propagation, Microstructure, Stress corrosion, Surface properties, Threshold effects, Residual stress, Mechanical properties, Chemical

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UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF AEROSPACE ENGINEERING

WASHINGTON UNIV SEATTLE DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Noise Generation by a Low-Mach-Number Jet,

(U) Mixing of Swirling Flows and Behavior of Wet Flows.

83 29P

DESCRIPTIVE NOTE: Annual rept. 1 May 82-30 Apr 83.

PERSONAL AUTHORS: Laufer, J. ; Yen, T. C. ;

NOV 83 7P

CONTRACT NO. F49620-82-K-0019

PERSONAL AUTHORS: Oates, G. C. ;

PROJECT NO. 2307

CONTRACT NO. AFOSR-80-0188

TASK NO. A2

PROJECT NO. 2307

MONITOR: AFOSR  
TR-84-0107

TASK NO. A4

MONITOR: AFOSR  
TR-84-0108

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Fluid Mechanics, v134  
p1-31 1983.

Reprint: Noise Generation by a Low-Mach-Number Jet.

DESCRIPTORS: (U) \*Jet flow, \*Noise(Sound), \*Acoustic measurement, Sources, Acoustic waves, Flow fields, Shear properties, Harmonics, Excitation, Radiated noise, Coherence, Directional, Time dependence, Subsonic flow, Sound transmission, Intensity, Far field, Saturation, Turbulence, Reprints

IDENTIFIERS: (U) Aeroacoustics, Jet noise, Shear layers, Flow instability, Noise generation, PE61102F, WUAFOSR2307A2

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes progress into research on the interaction of droplets with shock waves, the mixing of co-axial jets in the near region, the influence of nearby solid boundaries on multi-hole probes, and the behavior of shock trains in ramjet inlets. The study of the mixing of coaxial jets has been completed with the submission of a PhD dissertation. Appropriate software for laser velocimetry data reduction has been prepared for use with the droplet-shock wave study, and a computer program for the description of droplet shock wave interaction has been generated. Preliminary measurements of solid boundary influence on five hole probe readings have been taken, and optical data for shock trains in ramjet inlets have been obtained from both a water analogy rig and a supersonic wind tunnel.

DESCRIPTORS: (U) \*Jet mixing flow, \*Two phase flow, Drops, Shock waves, Interactions, Ramjet inlets, Boundaries, Solids, Optical data, Laser velocimeters, Probes

IDENTIFIERS: (U) Swirling flow, Coaxial jets, Multi-hole probes, PE61102F, WUAFOSR2307A4

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DTIC REPORT BIBLIOGRAPHY

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OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

PURDUE UNIV LAFAYETTE IN SCHOOL OF ELECTRICAL ENGINEERING

(U) Radio Frequency Plasma Introduction of Surface Functionalities onto Carbon and Surface Characterization by X-Ray Photoelectron Spectroscopy.

(U) New Techniques for Measuring Single Event Related Brain Potentials.

82

18P

DESCRIPTIVE NOTE: Final rept..

OCT 83

86P

PERSONAL AUTHORS: Miller, C. W.; Karweik, D. H.; Kuvana, T.;

PERSONAL AUTHORS: McGillem, C. D.; Aunon, J. I.;

CONTRACT NO. AFOSR-78-3672

CONTRACT NO. AFOSR-80-0152

PROJECT NO. 2303

PROJECT NO. 2313

TASK NO. A1

TASK NO. A4

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0139

TR-84-0127

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Recent Advances in Analytical Spectroscopy, p233-247 1982.

Reprint: Radio Frequency Plasma Introduction of Surface Functionalities onto Carbon and Surface Characterization by X-Ray Photoelectron Spectroscopy.

ABSTRACT: (U) Methods for selecting features of evoked patented (EP) waveforms to improve classification accuracy are described. It is found that use of an exhaustive search procedure gives moderate improvement over forward sequential feature selection and stepwise linear discriminant analysis procedures. A new procedure for classification using a combination of temporal and spectral representations of the data is described. Experimental results are presented illustrating the effectiveness of time-varying filters for processing EP waveforms. It is shown by means of computer simulations that much greater noise reduction is obtained with time-varying filters than is possible by any of the more conventional procedures that utilize time-invariant filters. At the same time the underlying waveforms are preserved by the filtering process. Modifications of a computer controlled display system to give precise timing measurements are described. Data showing the reduction in latency variance of EP components are presented. Reductions in the standard deviations of about 20% were obtained. Experimental measurements of EP waveforms using a Sternberg paradigm are described. Preliminary analysis of the results shows an apparent substructure in the P300 and a significant correlation of certain of the P300 components and reaction time. (Author)

DESCRIPTORS: (U) \*Surface chemistry, \*Electrochemistry, \*Radiofrequency, \*Plasmas(Physics), \*X ray photoelectron spectroscopy, Glassy carbon, Electrodes, Surfaces, Electrocatalysts, Catalysis, Impurities, Removal, Surface analysis, Oxidation reduction reactions, Cobalt, Porphyrins, Electron transfer, Reprints

IDENTIFIERS: (U) PE81102F, WJAFOSR2303A1

DESCRIPTORS: (U) \*Algorithms, \*Electroencephalography,

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\*Waveforms, \*Measurement, \*Brain, Pattern recognition, Parameters, Classification, Selection, Noise reduction, Linearity, Charts, Tables(Data), Methodology, Discriminate analysis

STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

(U) Progress and Problems in Storage Ring Free Electron Lasers.

IDENTIFIERS: (U) Evoked potential, Visual evoked potential, PE61102F, WUAFOSR2313A4

DESCRIPTIVE NOTE: Interim rept.,

FEB 83 6P

PERSONAL AUTHORS: Bazin, C.; Bergher, M.; Billardon, M.; Deacon, D. A. G.; Elleaume, P.;

REPORT NO. HEPL-923

CONTRACT NO. F49620-80-C-0068

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR  
TR-84-0101

#### UNCLASSIFIED REPORT

ABSTRACT: (U) This document discusses current problems in storage ring laser development: optics degradation, and the low gain available on unoptimized existing electron sources. The authors introduce the field with experimental data, and conclude with the most recent results. (Author)

DESCRIPTORS: (U) \*Lasers, Optics, Degradation, Electron beams, Experimental data, Kinetic energy, Rings, Coupling(Interaction), Klystrons

IDENTIFIERS: (U) \*Free electron lasers, \*Storage ring lasers, Electron sources, PE61102F, WUAFOSR2301A1

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CALIFORNIA UNIV BERKELEY DEPT OF MECHANICAL ENGINEERING WJAFOSR2307A4, PEB1102F

(U) The Changing Scene in Computational Fluid Dynamics.

DESCRIPTIVE NOTE: Interim rept.,

AUG 83 19P

PERSONAL AUTHORS: Holt, M. ;

CONTRACT NO. AFOSR-80-0230

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR  
TR-84-0115

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Computational Techniques Conference, 28-31 Aug 83, Sydney (New South Wales).

ABSTRACT: (U) The evolution of numerical techniques for solving problems in Fluid Dynamics is followed, in outline, from the days when Digital Computers were first available, at the end of the Second World War, to the present time, when the Computer Aerodynamic Simulator is being assembled. In this period the range of numerical methods has been broadened five fold, while the speed and capacity of computers have increased by several orders of magnitude. Two areas close to the author's interests are selected to illustrate these changes. The first concerns the extension of the Method of Integral Relations to apply to laminar and turbulent boundary layer problems, including internal flows, separated flows and turbulent mixing flows. The second area deals with unsteady inviscid compressible flow in one or more dimensions and a discussion is given of the relative merits of Godunov and Glimm techniques. (Author)

DESCRIPTORS: (U) \*Fluid dynamics, Computations, Laminar boundary layer, Turbulent boundary layer, Flow fields, Flow separation, Equations of motion, Internal waves, Integral equations

IDENTIFIERS: (U) Method of internal relations.

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OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

(U) A Versatile Sample Isolation, Chemical Modification and Introduction System Designed for a Physical Electronics Model 548 Electron Spectrometer.

(U) Simulation of the Cyclic Voltammetric Characteristics of a Second Order EC Catalytic Mechanism,

81

15P

82

30P

PERSONAL AUTHORS: Miller, C. W. ; Fagan, J. R. ; Karwelk, D. H. ; Kuvana, T. ;

PERSONAL AUTHORS: Dimarco, D. M. ; Forshey, P. A. ; Kuvana, T. ;

CONTRACT NO. AFOSR-78-3672, NSF-CHE78-81591

CONTRACT NO. AFOSR-78-3672, PHS-19181

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0136

TR-84-0133

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Applications of Surface Science, n9 p214-226 1981.

SUPPLEMENTARY NOTE: Pub. in ACS Symposium Series, n192 p71-97 1982.

Reprint: A Versatile Sample Isolation, Chemical Modification and Introduction System Designed for a Physical Electronics Model 548 Electron Spectrometer.

Reprint: Simulation of the Cyclic Voltammetric Characteristics of a Second Order EC Catalytic Mechanism.

DESCRIPTORS: (U) \*X ray photoelectron spectroscopy, \*Analytical chemistry, \*Surface chemistry, \*Electrochemistry, Chemical composition, Surfaces, Glassy carbon, Atomic properties, Radiofrequency, Plasmas(Physics), Chemical analysis, Sampling, Oxygen, Reprints

DESCRIPTORS: (U) \*Electrochemistry, \*Electrodes, \*Catalysis, \*Reaction kinetics, \*Voltammetry, Electrocatalysts, Surfaces, Oxidation reduction reactions, Oxygen, Iron, Porphyrins, Electron transfer, Diagnostic equipment, Constants, Computerized simulation, Reprints

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

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AD-A138 638 7/4

## OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

## OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

(U) Prospects in the Analysis of Chemically Modified Electrodes.

(U) Electrochemistry of Oxygen Reduction. 4. Oxygen to Water Conversion by Iron(II) Tetrakis(N-Methyl-4-Pyridyl)Porphyrin via Hydrogen Peroxide,

82 33P

83 11P

PERSONAL AUTHORS: Karweik, D. H. ; Miller, C. W. ; Porter, M. D. ; Kuwana, T. ;

PERSONAL AUTHORS: Forshey, P. A. ; Kuwana, T. ;

CONTRACT NO. AFOSR-78-3872

CONTRACT NO. AFOSR-78-3672

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR  
TR-84-0138MONITOR: AFOSR  
TR-84-0137

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in ACS Symposium Series, n188 p89-119 1982.

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v22 n5 p899-707 1983. Includes errata sheet dated 9 Apr 83.

Reprint: Prospects in the Analysis of Chemically Modified Electrodes.

Reprint: Electrochemistry of Oxygen Reduction. 4. Oxygen to Water Conversion by Iron(II) Tetrakis(N-Methyl-4-Pyridyl)Porphyrin via Hydrogen Peroxide.

DESCRIPTORS: (U) \*Electrodes, \*Electrochemistry, \*Surface chemistry, Chemical analysis, Surface analysis, Atomic properties, Molecular properties, Catalysis, Electrocatalysts, Topography, Surfaces, Structural analysis, Chemical bonds, Electron transfer, Test methods, Reprints

DESCRIPTORS: (U) \*Electrochemistry, \*Oxygen, \*Reduction(Chemistry), Water, Iron compounds, Porphyrins, Hydrogen peroxide, Glassy carbon, Electrodes, Electrocatalysts, Catalysis, Oxidation reduction reactions, Coulometers, Reprints

IDENTIFIERS: (U) CME(Chemically Modified Electrodes),  
PE61102F, WUAFOSR2303A1

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 038187

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OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY

COLORADO UNIV AT BOULDER DEPT OF AEROSPACE ENGINEERING SCIENCES

(U) Electrocatalytic Reduction of Molecular Oxygen Using Water-Soluble and Immobilized Iron and Cobalt Porphyrins.

82 26P

DESCRIPTIVE NOTE: Interim rept..

PERSONAL AUTHORS: Forshey, P. A. ; Kuwana, T. ; Kobayashi, N. ; Osa, T. ;

OCT 82 17P

PERSONAL AUTHORS: Freymuth, P. ; Bank, W. ; Palmer, M. ;

CONTRACT NO. AFOSR-78-3672

CONTRACT NO. AFOSR-81-0037

PROJECT NO. 2303

PROJECT NO. 2307

TASK NO. A1

TASK NO. A2

MONITOR: AFOSR TR-84-0135

MONITOR: AFOSR TR-84-0121

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Advances in Chemistry Series, v201 p601-624 1982.

Availability: Document partially illegible.

Reprint: Electrocatalytic Reduction of Molecular Oxygen Using Water-Soluble and Immobilized Iron and Cobalt Porphyrins.

SUPPLEMENTARY NOTE: Summary in German.

DESCRIPTORS: (U) \*Electrochemistry, \*Electrocatalysts, \*Reduction(Chemistry), \*Oxygen, Molecules, Iron compounds, Cobalt compounds, Porphyrins, Water soluble materials, Catalysis, Oxidation reduction reactions, Electron transfer, Electrodes, Computerized simulation, Electric current, Voltammetry, Hydrogen peroxide, Reprints

ABSTRACT: (U) Accelerating flow around an airfoil was visualized using smoke techniques. The flow started from rest and acceleration was kept constant for 5 seconds. Movies and single-frame photographs of the developing flow were taken for various angles of attack. The developing vortex patterns are interpreted as the elaborate initiation of an unsteady turbulent vortex street. (Author)

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A1

DESCRIPTORS: (U) \*Unsteady flow, \*Flow visualization, Airfoils, Acceleration, Vortices, Smoke, Angle of attack, High angles, Turbulent flow

IDENTIFIERS: (U) Acceleration flow, Vortex streets, PE61102F, WUAFOSR2307A2

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SEARCH CONTROL NO. 038187

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COLORADO UNIV AT BOULDER DEPT OF AEROSPACE ENGINEERING  
SCIENCE

(U) Apparent-Mass Coefficients for Isosceles Triangles and  
Cross Sections Formed by Two Circles.

SEP 83 10P

PERSONAL AUTHORS: Huang, M. K. ; Chow, C. Y. ;

CONTRACT NO. F49620-83-K-0009, AFOSR-82-0037

PROJECT NO. 2307

TASK NO. A2

MONITOR: AFOSR  
TR-84-0112

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Aircraft, v20 n9 p810-  
818 Sep 83.

Reprint: Apparent-Mass Coefficients for Isosceles  
Triangles and Cross Sections Formed by Two Circles.

DESCRIPTORS: (U) \*Conformal mapping, \*Mass, \*Aerodynamic  
forces, Wing body configurations, Fuselages, Triangles,  
Moments, Cross sections, Coefficients, Lift, Fluid  
mechanics, Approximation(Mathematics), Slender bodies,  
Theory, Reprints

IDENTIFIERS: (U) Apparent mass, Isosceles triangles,  
Slender body theory, Side forces, Arcs(Mathematics),  
PE81102F, WUAFOSR2307A2

AD-A138 612

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AD-A138 608 7/4 20/2

COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY

(U) Brillouin and Rayleigh Scattering Studies of the Phase  
Transition in Chloranil.

JUL 83 15P

PERSONAL AUTHORS: Yoshihara, A. ; Bernstein, E. R. ; Ralch, J.  
C. ;

CONTRACT NO. AFOSR-82-0122

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR  
TR-84-0132

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v79,  
n1 p445-458, 1 Jul 83.

Reprint: Brillouin and Rayleigh Scattering Studies of the  
Phase Transition in Chloranil.

DESCRIPTORS: (U) \*Chlorine compounds, \*Quinones,  
\*Brillouin zones, \*Rayleigh scattering, \*Phase  
transformations, Phase studies, Rotation, Symmetry, Light  
scattering, Boundaries, Phonons, Propagation, Anomalies,  
Temperature, Stress relaxation, Relaxation time, Radiant  
intensity, Elastic properties, Ferroelectricity, Reprints

IDENTIFIERS: (U) \*Chloranil, WUAFOSR2303A3, PE81102F

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SEARCH CONTROL NO. 038187

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AD-A138 567 7/3 20/2 7/4

COLORADO UNIV AT BOULDER DEPT OF AEROSPACE ENGINEERING SCIENCES

COLORADO STATE UNIV FORT COLLINS DEPT OF CHEMISTRY

(U) Unsteady Separated Flows: Vorticity and Turbulence.

(U) Critical Fluctuations at the Phase Transition in Benzil.

DESCRIPTIVE NOTE: Final progress rept. 1 Nov 80-31 Oct 82.

SEP 83 12P

OCT 82 67P

PERSONAL AUTHORS: Luttses, M. W.; Chow, C. Y.; Kennedy, D. A.; Freymuth, P.;

PERSONAL AUTHORS: Yoshihara, A.; Bernstein, E. R.; Raich, J. C.;

CONTRACT NO. F49620-83-K-0009, AFOSR-81-0037

CONTRACT NO. AFOSR-82-0122

PROJECT NO. 2307

PROJECT NO. 2303

TASK NO. A2

TASK NO. A3

MONITOR: AFOSR

MONITOR: AFOSR  
TR-84-0131

TR-84-0120

UNCLASSIFIED REPORT

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Availability: Document partially illegible.

ABSTRACT: (U) Recent research progress on this multi-investigator program in unsteady separated flows is summarized. Specific projects reviewed include: (a) oscillating airfoil dynamic stall; (b) vortex entrapment and stability analysis; and (c) natural flight lift mechanisms. Research is continued under AFOSR contract F49620-83-K-0009. (Author)

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v79 n6 p2504-2514, 15 Sep 83.

Reprint: Critical Fluctuations at the Phase Transition in Benzil.

DESCRIPTORS: (U) \*Airfoils, \*Unsteady flow, \*Flow separation, \*Stalling, \*Vortices, Lift, Aerodynamics, Shear properties, Flat plate models, Oscillation, Turbulent flow, Stability, Dynamics, Flow visualization, Wings, Birds, Insects

DESCRIPTORS: (U) \*Benzoin, \*Single crystals, \*Phase transformations, Brillouin zones, Scattering, Rayleigh scattering, Acoustic properties, Optical properties, Boundaries, Elastic properties, Constants, Anomalies, Width, Temperature, Symmetry (Crystallography), Theory, Phonons, Reprints

IDENTIFIERS: (U) Vortex entrapment, Dynamic stalling, Unsteady aerodynamics, Shear flow, PE61102F, WUAFOSR2307A2

IDENTIFIERS: (U) \*Benzil, WUAFOSR2303A3, PE61102F

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AD-A138 498 20/5 5/1

STANFORD UNIV CA HIGH ENERGY PHYSICS LAB

SOCIETY FOR OPTICAL AND QUANTUM ELECTRONICS MCLEAN VA

(U) Additional Bunch Lengthening Results on the ACO SRFEL  
(Stanford Free Electron Laser Group).

(U) Proceedings of the International Conference on Lasers  
'81 Held at New Orleans, Louisiana on 14-18 December  
1981.

FEB 83 4P

PERSONAL AUTHORS: Robinson, K. E. ; Deacon, D. A. G. ; Velghe,  
M. F. ; Madey, J. M. J. ;

DESCRIPTIVE NOTE: Final rept. Dec 81-Dec 82,

DEC 81 1173P

CONTRACT NO. F49620-80-C-0068

PERSONAL AUTHORS: Collins, C. B. ;

PROJECT NO. 2301

CONTRACT NO. AFOSR-82-0072

TASK NO. A1

PROJECT NO. 2301

MONITOR: AFOSR  
TR-84-0102

MONITOR: AFOSR  
TR-83-0835

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. de Physique, Conf c1  
suppl n2 v44 pc1-378 - c1 -381 Feb 83. Abstract in French.

UNCLASSIFIED REPORT

Reprint: Additional Bunch Lengthening Results on the ACO  
SRFEL (Stanford Free Electron Laser Group).

Availability: Society for Optical and Quantum Electronics,  
P.O. Box 245, McLean, VA 22101 HC \$95.00 (No copies  
furnished by DTIC/NTIS).

DESCRIPTORS: (U) \*Mathematical models, \*Stochastic  
processes, \*Heating, Laser applications, Klystrons,  
Reprints

ABSTRACT: (U) The International Conference on Lasers '81  
was held in New Orleans, Louisiana, December 14-18, 1981.  
Over 600 scientists participated in this meeting. More  
than 150 papers and posters were presented in a wide  
range of topical fields related to laser development and  
laser applications. (Author)

IDENTIFIERS: (U) Bunch lengthening, PEB1102F,  
WJAFOSR2301A1

DESCRIPTORS: (U) \*Lasers, \*Laser applications, \*Symposia,  
Reports, Excimers, Spectroscopy, Medicine, X rays, Gamma  
rays, Excitons, Tunable lasers, Infrared lasers, Polarization,  
Laser cavities, Molecular lasers, Solid  
state lasers, Geodesy

IDENTIFIERS: (U) Free electron lasers, Nuclear pumped  
lasers, High energy lasers, Metal vapor lasers, PEB1102F,  
WJAFOSR2301A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. 038187

AD-A138 390 7/4 20/8

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Negative-Ion Formation from Surface Scattering and the Anderson Correlation Energy U.

DESCRIPTIVE NOTE: Technical rept.,

FEB 84 22P

PERSONAL AUTHORS: Lam, K. S.; Liu, K. C.; George, T. F.;

REPORT NO. UROCHESTER/DC/84/TR-49

CONTRACT NO. N00014-80-C-0472, AFOSR-82-0048

MONITOR: AFOSR  
TR-84-0444

UNCLASSIFIED REPORT

ABSTRACT: (U) A theoretical investigation of negative-ion formation from positive-ion-surface scattering is presented from a unified point of view. Based on the time-dependent Anderson-Neuhaus model, the correlation energy U is seen to play an important role in the two-electron transfer process. Calculations of the probability of negative-ion formation are in good agreement with experiments on the conversion of H(+)D(+) to H(-)D(-) by scattering from a cesiated W(100) surface. (Author)

DESCRIPTORS: (U) \*Anions, \*Cations, \*Ion beams, \*Surface reactions, Scattering, Electron transfer, Neutralization, Nuclear reactions, Ion exchange, Electronic states, Valence, Conduction bands, Impact, Velocity, Interactions, Excitation, Hydrogen, Deuterium, Mathematical analysis, Models, Correlation, Energy, Time dependence

IDENTIFIERS: (U) WUNR058749

AD-A138 390

AD-A138 307 5/1 6/4

CARNEGIE-MELLON UNIV PITTSBURGH PA ROBOTICS INST

(U) Constraint-Directed Search: A Case Study of Job-Shop Scheduling.

DESCRIPTIVE NOTE: Doctoral thesis,

DEC 83 197P

PERSONAL AUTHORS: Fox, M. S.;

REPORT NO. CMU-RI-TR-83-22, CMU-CS-83-161

CONTRACT NO. F49620-82-K-0017

MONITOR: AFOSR  
TR-84-0227

UNCLASSIFIED REPORT

ABSTRACT: (U) This thesis investigates the problem of constraint-directed reasoning in the job-shop scheduling domain. The job-shop scheduling problem is defined as: selecting a sequence of operations whose execution results in the completion of an order, and assigning times (i.e., start and end times) and resources to each operation. The number of possible schedules grows exponentially with the number of orders, and possible production plans, substitutable resources, and possible times to assign resources and perform operations. The acceptability of a particular schedule depends not only on the availability of alternatives, but on other knowledge such as organizational goals, physical limitations of resources, causal restrictions amongst resources and operations, availability of resources, and preferences amongst alternatives. By viewing the scheduling problem from a constraint-directed search perspective, much of this knowledge can be viewed as constraints on the schedule generation and selection process. In this thesis, we present a system called ISIS. ISIS uses a constraint-directed search paradigm to solve the scheduling problem. ISIS provides: a knowledge representation language (SRL) for modeling organizations and their constraints; hierarchical, constraint-directed scheduling of orders, which includes: constraint-directed bounding of the solution space; context-sensitive selection of constraints, and weighted interpretation of constraints; analytic and generative constraint relaxation; and techniques for the diagnosis of poor

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AD-A137 985 6/16 6/1

schedules.

YALE UNIV NEW HAVEN CT DEPT OF NEUROLOGY

DESCRIPTORS: (U) \*Scheduling, \*Production, \*Sequences,  
\*Management planning and control, Operations research,  
Artificial intelligence, Computer applications, Models,  
Information processing, Semantics, Syntax, Computer logic,  
Problem solving, Decision making

(U) The Effects of Hydrazines and Related Compounds on  
Calcium Calmodulin Regulated Synaptic Processes.

DESCRIPTIVE NOTE: Final scientific rept. 1 Jun 82-1 Jul  
83,

IDENTIFIERS: (U) ISIS modeling system, Knowledge  
representation

JUL 83 19P

PERSONAL AUTHORS: DeLorenzo, R. J. ; Rasenick, M. M. ;

CONTRACT NO. AFOSR-82-0284

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR  
TR-34-0025

#### UNCLASSIFIED REPORT

ABSTRACT: (U) This research effort studied the effects of hydrazines and organophosphates on various synaptic processes. The cyclic nucleotide related portions of this study included an examination of the effects of hydrazines upon synaptic membrane adenylyate cyclase, cyclic nucleotides and any dynamic membrane events which might be related to the above processes. We were able to show distinct effects of hydrazines upon both catalytic moiety and catalytic moiety-G unit regulated adenylyate cyclase. The calcium calmodulin kinase studies in this project investigated the effects of hydrazines and organophosphates on isolated membrane fractions and intact synaptosome preparations. We found that hydrazines and organophosphates have effects on the incorporation of 32 p-phosphate into several specific synaptic proteins and attempted to probe the molecular mechanism mediating the effects of these compounds. These studies provide an insight into the toxic effects of hydrazines and organophosphates on neuronal tissue and may help develop effective methods to prevent and treat these effects in man.

DESCRIPTORS: (U) \*Hydrazines, \*Synapse, Organophosphates,  
Adenyl cyclase, Nucleotides, Cyclic compounds, Proteins,  
Toxicity

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IDENTIFIERS: (U) Calcium calmodulin, PE61102F,  
WUAFOSR2312AS

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